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Richard Taylor.

HORÆ ENTOMOLOGICÆ.

Speedily will be published,

The Second Part of this Volume, containing *An Attempt to ascertain the Situation and Rank which the* Scarabæus sacer *of Linnæus holds among Organized Beings.*

81570.

Horæ Entomologicæ:

OR

ESSAYS

ON

THE ANNULOSE ANIMALS:

BY

W. S. MACLEAY, Esq. A.M.
OF TRINITY COLLEGE, CAMBRIDGE.

Vol. I. Part I.

CONTAINING

General Observations on the Geography, Manners, and Natural Affinities of the Insects which compose the Genus *Scarabæus* of Linnæus;

TO WHICH ARE ADDED

A few incidental Remarks on the Genera *Lucanus* and *Hister* of the same Author.

WITH AN APPENDIX AND PLATES.

> " *Les Entomologistes multipliaient à l'envi les observations; mais ils se* " *dispensaient de les généraliser.*"—Savigny, Mem. sur les Animaux sans Vertèbres. *Part* I. *Pref.*

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PREFACE.

In offering to the public this, his first essay in Entomology, the author thinks it by no means unlikely that he shall incur the charge of aiming at innovations in the science. The following remarks are, however, as he conceives, entirely practical, and the examination of their accuracy is within the reach of every entomological student. By such persons at least, therefore, he trusts that they will be considered as proceeding from a wish to connect and to reconcile with each other the observations of his predecessors, rather than from an absurd ambition to controvert or obliterate the result of their labours.

The author has for the present confined his attention to one branch of the science; principally, indeed, because he coincided with Fabricius in imagining that on *Monographs* has been founded almost every thing in the general systems now in use that can strictly be called natural. But the vast number also of animated beings which has been added to our lists since Linnæus first published his *Systema Naturæ*, and the still increasing numbers which daily arrive from the most remote quarters of the globe, or which swell our indigenous catalogues in proportion as our Fauna is explored, render it almost impossible for the naturalist to study in detail, more than one department of that which may be his favourite science. Of entomology in particular there are no bounds to the stores, and it may truly be said of insects,

> " *Sed neque quam multæ species nec nomina quæ sint*
> " *Est numerus.*"

Amidst these countless multitudes, the animals which compose the Linnæan genus *Scarabæus* appear in all ages to have attracted the notice of the admirers of nature. This may have been partly owing to their size, and partly to their splendour; but still more likely to the celebrity of the Ἡλιοκάνθαρος, or *Scarabæus pilularius* of the ancients,—an insect which from the singularity of its form and manners, became even an object of veneration and worship with the ancient Egyptians.

Indeed it was the peculiar interest which the *Scarabæus sacer* of Linnæus excited, as being a principal among the many objects "*qualia demens Ægyptus coluit*," that first led the author to investigate its natural history with the intention of drawing up a monograph[a] of the several species composing the genus *Ateuchus*, to which this insect had been referred by Weber and Fabricius. But he soon found that the unsettled and hitherto ill-defined state of the science had not only rendered this celebrated species, by means of repeated changes in nomenclature, unknown to any but entomologists; but that several other very distinct species were confounded together with it, under the trivial name of *sacer*. To this difficulty was added the unaccountable circumstance, that none of the great systematic authors, except Fabricius and Latreille, had properly distinguished it from other Coleopterous insects with lamellate antennæ, although the habits of these are often totally different. It thus was evident, that to review the whole of the Lamellicorn insects, properly so called, became necessary for any one who might wish to have correct ideas of the true place held in nature by the most interesting of the tribe. And as his father possessed a cabinet containing nearly 1800 species of the Linnæan genus *Scarabæus*, the author was led to imagine that few could be placed in a situation more favourable for the investigation, than himself; and, therefore, that it would be in some measure inexcusable, did he not make the attempt. But in undertaking this task— as he has been obliged to search for an arrangement which when adopted should coincide with nature, and as after some time and labour bestowed on the research, he is still unable to lay down any distinct principle or rule by means of which such a classification may be arrived at—it seems necessary that he should here make a few remarks on systems in general, as well as on that plan which it has been judged proper to pursue in the following pages.

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[a] This intention has since been abandoned, in consequence of a work "*sur les Insectes Sacrés d'Egypte*" being now in the hands of the person in Europe the best able to treat the subject—M. Latreille de l'Academie Royale des Sciences.

If it be true, as has been said, that there are few persons who form an accurate idea of what is meant by a System in natural history, it is equally just that there are still fewer persons who comprehend the exact difference between the Natural and an Artificial System, although the whole science now depends on this distinction being thoroughly understood. A celebrated French naturalist[a] has indeed defined a *System* to be an arrangement of bodies according to the distinctions taken from the consideration of one only of their external parts and properties; whereas he considers a *Method* to be an arrangement founded upon distinctions drawn from the form and structure of several of these parts. But so far as relates to their effects on natural history, the author of the following work has had reason to remark, that a system and method, in the above acceptation of the words, may be made to amount to the very same thing; and he has even been led to believe that a system or method entirely founded on *distinctions* must be artificial, whether such distinctions be drawn from the consideration of one or of one hundred parts. The chances, perhaps, are in favour of our being the least distant from truth in the latter of these two cases:—but after all, if any certain or positive difference can exist between them, it seems to be, that the greater the number of parts on which the distinctions are founded, the less convenient for use will be that particular method.

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[a] Cuvier, *Dict. des Sciences Naturelles. Pref.*

A system has also been said to act precisely towards enabling mankind to derive advantage from discoveries in natural science, as a dictionary in a particular language enables the world to participate in the discoveries that may have been made in that language. Now this observation is perfectly just, provided the system alluded to be an artificial one, and the discoveries it elucidates be supposed to refer entirely to nomenclature; for names in an artificial system are exactly what words are in a dictionary. But all knowledge in natural history beyond this of nomenclature, is not (speaking properly) to be inculcated by a system, but is collectively itself no other than the *Natural System.* If, therefore, this natural system be said to be a medium for teaching the properties of natural objects, the definition is equally unhappy as if it were said that the system of the universe enables mankind to acquire a knowledge of itself, that is, of the various properties of the heavenly bodies. In natural philosophy a system has usually indeed been considered as synonymous with an hypothesis; but the two ideas expressed by these words have of late been very properly distinguished by observing that though a mere fiction or hypothesis may explain phænomena, yet a system is a certainty that must be deduced from these. The existence of particular phænomena can therefore never be legitimately proved or explained by a system, though they are virtually included in it, much in the same manner as in the statement of a proposition all those facts are assumed upon which its demonstration may depend.

When it is considered that in proportion to the number of data used in any investigation, the greater is the accuracy of the result, there seems little difficulty in allowing that the perfect knowledge of the natural system must consist in that of *all* the phænomena of natural history. This is moreover in no small degree rendered probable, though not absolutely confirmed, by the well known circumstance that the observations, whether of distinction or affinity, which are taken from the consideration of any single organ, of themselves alone invariably produce an artificial system. Nor ought it indeed to excite surprise, that a definite truth can rarely be obtained by reasoning on solitary data; because we are usually in such cases forced to call in some hypothesis to our aid in order to arrive at a conclusion. Yet thus it is that the habit of reasoning on single facts has been the bane of the study of nature, that it has led many of us totally away from the true path, and created such a delusion that we often imagine the most to be known when in reality we know nothing.

Were the planets to be arranged in a table according to any one of their properties,—as for instance, the period of rotation on their several axes,—such a system would be artificial, and only useful in that, having observed the length of a rotation, a reference to the table would be a convenient mode of determining the name of the planet. But no one would ever think of confounding this artificial table or system with the system of the universe; although an error exactly similar is every day committed in natural history, when a person who may by the mere exercise of his memory have become acquainted with an artificial table, fancies that he must therefore be a profound naturalist.

If it should be asked what is here meant by an artificial table in natural history, the author would reply, that such in his opinion is that rather oddly termed *Système de la Nature*, which has been defined by Cuvier to be a great catalogue in which all organized beings have suitable names, can be recognised by suitable characters, and may be distributed into divisions and subdivisions which are themselves also named and characterized. If then such a system as this be termed a dictionary, the true natural system may be reputed the language to which it refers; and as a dictionary is nothing but an useless assemblage of words, without some grammar or rules of syntax by means of which a knowledge of the structure of the language may be acquired, so an artificial system is a dry unmeaning collection of names, unless it be made subservient to the discovery of the natural one. An artificial system, according to what has been said, must always be more or less a violation of natural order; since it has no higher pretensions, no other merit, than the readiness and facility with which it may enable an object to be named; and again, because this facility seems principally to depend on the assumption of arbitrary distinctions with which nature is altogether unacquainted. But it is different with respect to the natural system; since an injury to the order of creation in this ought to be as offensive and as readily perceptible to the naturalist, as an error of syntax is to the grammarian. An artificial system depends solely on observation, and may even be said to require the exercise of no other faculty than that of vision. The discovery of the natural one, on the contrary, is only to be hoped for from a cautious process of inductive and analogical reasoning, applied to facts gathered from observation. Thus it requires neither talent nor ingenuity to invent an artificial system, and there may be as many hundreds of such as there are heads to devise them; but of natural systems there is and can be only one. Finally, the former is the miserable resource of the feeble mind of man, unable to comprehend in one view the innumerable works of the creation; whereas the natural system is the plan of the creation itself, the work of an all-wise, all-powerful Deity.

It will then scarcely be believed, that while the scientific world is inundated with artificial systems, the imperfections of which are daily discovered and daily criticized, not one in a hundred naturalists takes a more exalted view of the creation than to become acquainted with that farrago of names which so many confound with the natural system. And it will still less be credited, that some of those even who can properly distinguish them, either covertly insinuate or openly assert that we ought to rest contented in our ignorance, and to cease our inquiries after those affinities, from the study of which, says a learned writer, " the science acquires new dignity; and instead of being conversant merely with exterior forms and nominal distinctions, becomes acquainted with the laws and operations of nature[a]."

Though Linnæus first distinguished the natural from all artificial systems; yet with true philosophic caution he was satisfied, at the early period when he wrote, that the first step towards ascertaining the plan on which organized beings were constructed, was to acquire some general knowledge of the beings themselves. He therefore cultivated his artificial systems and his specific differences, to the comparative neglect of the higher branches of the science; and imagined that his time was thus more rationally employed, in collecting materials for himself and others to work upon at some future period, than if he commenced at once the investigation of natural affinities.

This methodical order in the study of the science on which he threw so much light, is one of the best proofs of his excellent sense: nay, a deviation from it by an ordinary individual at that time would have argued as much presumption as ignorance. But there are exceptions to every rule, and Linnæus was so gifted by nature, and undoubtedly possessed such an intuitive knowledge of her arrangement, that we cannot but regret that his time should have been employed more conformably to the dictates of his modesty than to the advantage of science. It was this modesty which probably induced him to make the unfortunate remark, that they who used an imperfect natural method, rejecting the artificial system, seemed to him like persons overturning a commodious and well covered house in order to build another in its place, the roof of which they are incompetent to complete. But if such an opinion was unfortunate for the celebrated man with whom it originated, it was more peculiarly so for those disciples who have always adhered to the principles and sworn by the words of their master, even when they may have differed from him in their application. Relying on authority of such weight, they thought that, because they were secure from present blame, they must also be secure of future glory in following his example. They forgot that in the above remark Linnæus takes a circumstance for granted, which surely it is not for any human being to decide upon; namely, the incompetence of mankind to arrive at the natural method. They failed to observe that it is as impossible as hopeless, that we should ever be able to bring our knowledge of the natural system to perfection, unless we make use of the imperfect fragments of it which we already possess. Surely, at least, it was not by leaving every thing to hazard, and by losing sight of the natural system altogether, that they ought to have expected its discovery. The simile of Linnæus would indeed have been more accurate had he said, that to imagine that the natural method can be discovered without a previous acquaintance with an artificial one, is to fancy that it is possible to erect a building without having collected the materials necessary for the undertaking. But then he ought to have added, that he who contents himself with an artificial method without a wish to attain the natural one, is a man who lives quietly and indolently amid a confused mass of materials, that might with industry enable him to construct that fabric of which the architect in the true sense of the word, is no other than the great Creator himself.

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[a] Roscoe, *Linn. Trans.* vol. xi.

Setting aside their convenience for use as catalogues, it may, however, be fairly asked, what good purpose hitherto have these artificial systems, these commodious and well-covered houses answered? The ichthyologist may, for instance, pride himself on his knowledge of the "finny race;" but unless he possess some nobler ambition than a perfect acquaintance with an artificial system, he must not be surprised that all his vaunted science is to be surpassed by that of many a poor fisherman. Both may with equal ease be able to give a name to the objects of their search, and both of them are equally ignorant of their natural affinities. Wherein, it may be asked, does the *practical* botanist (to use a modern expression) differ from the village herbalist or culler of simples; unless it be that the latter cannot give so learned a name as the former, to what it may have cost them equal trouble to find? The advocate of artificial methods will answer, perhaps, that the difference between the above two collectors is, that the one refers species to their genera, whereas the practical skill of the other is confined to species alone. But in reply to this, a question at first arises, namely—whether the notion of genera, as commonly understood by naturalists, be altogether accurate? And then, even though this doubt should be decided in the affirmative, it ought to be recollected that the notion of genera is not peculiar to naturalists; but that, on the contrary, the rudest and most uncultivated mind readily perceives it; and indeed, that it must have existed in man ever since he exercised so common a faculty as comparison. When the ancients divided the vegetable kingdom into plants alimentary, medicinal, poisonous, tinctorial, and so forth, the classification was not perhaps very scientific; but a division into genera was thereby as strictly implied, as if the stamens and pistils had been taken into consideration. Linnæus, therefore, in his definition of genera, has done nothing more than expressed with precision an idea, which, whether it be correct or not is another question, but which must certainly have been coexistent with the first use of human reason.

But it is said that every naturalist who has hitherto proposed a natural system, has thereby only deceived himself and others with an illusive structure, which, like the castle in a fairy tale, falls to pieces on being tried by the talisman of truth. The fact is perhaps indisputable;—but what after all does it prove? not certainly that the existence of the natural system is chimerical, or that the discovery of it is impracticable. Yet, according to Linnæus, the false naturalist is he who flatters himself with the idea of having attained the natural method, "*qui methodum naturalem sibi notam crepat.*" There can indeed be no doubt that the natural method is often in the mouths of the very persons who have the least notion of what it means. This, however, is not exactly the question at issue. We have in truth to learn, whether the investigation of the order of nature ought altogether to be abandoned; for it is idle to assert that any man in his senses will waste his time in seeking that which, if the opinion of Linnæus be adopted, he must be convinced that it is ridiculous in him to fancy that he can ever find. Before, therefore, we can admit the above definition to be correct, it is surely requisite for its defenders to prove, either the truth of the

Epicurean doctrine, and show that every form of matter takes its source solely from the casual concurrence of atoms; or, if a regular order and arrangement be by them allowed to exist—in short, if there has been a creation,—that it is impossible for man to discover the plan on which it has been conducted. When the truth of either of these hypotheses—the first of which Linnæus was certainly the last man ever to have entertained—shall rest on a foundation more solid than bare assertion, then, and not till then, we may adopt the above celebrated definition. But in the mean time, were it said that the mere ability to assign an arbitrary name, without any further object in view, however it may argue that our time has been employed, can never show that any substantial knowledge has been acquired, we should therein assert nothing that requires demonstration, nothing that is not self-evident and equally true, whether the natural system be hypothetical or not.

The author is aware that for the decided nature of these reflections he is likely to be judged severely by some of those persons whose opinions in general he would always regard with deference. But truth is the sole object at which he aims; and though he venerates the name of Linnæus, he has always endeavoured that it should not be so blindly as to render this his object unattainable. He repeats, that he honours the memory of this great man; but not on account of his precision of description; for this, except in the case of species and genera, Linnæus has himself acknowledged to be prejudicial to an acquaintance with the natural method; nor on account of his learning in synonyms; for this, though a very useful, is also but a very humble species of compilation; and finally, not on account of his having been a happy inventor of words, since this is the excellence of a grammarian rather than of the naturalist. The glory of Linnæus is built, as the author conceives, on much more stable foundations; for the man who first pointed out the distinction between the natural method and an artificial system, who first perceived the impossibility of giving either accurate definitions or characters to natural groups, and who first remarked the existence of intermediate genera between natural orders, must always be considered as one of the principal founders of our knowledge with respect to the natural system, whensoever this shall appear.

A French botanist[a] has indeed wittily styled Linnæus the Aristotle of the North: but this is to be accounted a reflection on certain disciples of the celebrated Swede, and not on himself. The merits of Linnæus and Aristotle must both be judged, not by the discoveries made since they flourished, but by the comparison of what they made known with that which was known before them. Neither of these great men can be blamed because servile schools of followers may have risen up, and boldly preached their infallibility; or because with a superstitious intolerance their disciples may have denounced as a species of heresy, the praiseworthy ambition of those who wished to penetrate further than themselves into the secrets of nature. The nation which has borne the brunt of these absurd charges in natural history is at last triumphant; it can now appeal to facts, and leave the world to judge between its original discoveries on the one hand, and the monotonous chiming on the ideas of Linnæus, which its adversaries have contented themselves with, on the other. Who indeed, without the imputation of prejudice, can now assert that the Northern schools have done as much within the last thirty years for natural history, as some of their more southern opponents? The truth is, that, like the religion of Mahomet, the Linnæan system has given rise in some parts of Europe to an unfortunate species of self-content, a barbarous state of semi-civilization, which is so far worse than absolute ignorance, that the existence of it seems to preclude every attempt at further improvement.

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[a] Mirbel, *Elem. de Botanique.*

In England, the country where above all others the spirit of emulation produces the noblest effects, it was truly unfortunate that no previous system or method of natural history was in vogue at the period of the Linnæan discoveries. We shall have ever perhaps to regret that no English name, not even that of Ray, was sufficiently known or admired at the time to be put in competition with the gigantic authority of Linnæus. All minor luminaries, indeed, were lost in the blaze of light, which thus at once succeeded almost utter darkness. To widen the field of inquiry, is of itself no small service rendered to science; and this praise, at least, both Adanson in Botany, and Fabricius in Entomology, have a right to claim. Yet the dazzling power of the Linnæan name has detracted even from the merits of these men, who have secured immortality were it only because they dared think for themselves. It was however this last circumstance, in fact, which in the eyes of some of our countrymen constituted their crime,—an unfortunate prejudice, since, through it, some future historian of the progress of human knowledge will have to state that England, till within the few last years, stood still at the bottom of the steps where Linnæus had left her, while her neighbours were advancing rapidly towards the entrance of the temple. To France is the same glory due for having resisted this *vis inertiæ*, that we have seen England obtain for the dispersion of the Aristotelian clouds which once obscured natural philosophy. Tournefort was a mighty name, which, though infinitely inferior in true value to that of Linnæus, was nevertheless, fortunately for them, of sufficient importance with his countrymen to make them call in question the infallibility of any other. When therefore the majestic eloquence of Buffon and the profound observations of Bernard Jussieu were publicly known, a few French naturalists became satisfied that natural history had higher objects in view, than either to name the contents of a museum, to describe new species, institute new genera, or even to unravel the intricacy of synonyms.

This country also has at last, under the auspices of a few justly celebrated men, spurned the fetters so long imposed on her, and proclaimed to the world, that whatever degree of respect may be due to the name of Linnæus, (and none has paid a greater,) yet nature, and nature only, is infallible. It was thus only that England could ever have taken her proper place in the annals of natural science—that pre-eminent place to which her discoveries in philosophy proved that she was entitled, even at the moment when her naturalists were lost in prejudice, if not in error. But this prejudice is, in truth, to be imputed to some only of our countrymen, since the whole of Europe acknowledges and admires, among a few exceptions from it, that venerable one where splendid talents, a long life, and princely fortune have been invariably devoted to patronize science, without regarding either the garb, the language, or the peculiar opinions of the person by whom it may have been cultivated.

In the following pages, the author, sincerely convinced that the object he had in view would have been otherwise unattainable, has endeavoured to pursue the example set by the new school of naturalists; for he happens indeed to be one of those who prefer an imperfect transitory glimpse of nature, pure and unveiled, to a full view of the most commodious and ostentatious mantle that can be employed to conceal her beauties from the gaze. With such sentiments, it cannot be a matter of surprise that he should have distrusted names still more celebrated in entomology than that of Linnæus, when their authority was used to confirm a system. His confidence, however, in the OBSERVATIONS of these much respected persons has been always implicit, and if he has ventured to criticize their theory, it would be truly ungenerous in him not to state that his present opinions have been founded on the accuracy of the facts to which they first drew his attention. To observe, to compare, and from these observations and comparisons to attempt to draw conclusions, has been the common plan pursued both by them and by himself. The conclusions thus arrived at, it is true, have been very different; but the author would by no means be understood to offer his own to the public as rigidly correct. He wishes, on the contrary, that they may be subjected to the same criticism, that with the same doubt and constant reference to nature for their accuracy, they may be examined by those entomologists who would explore the same path. And if when assayed by this last only legitimate test, an error in the following remarks shall be detected, he trusts that he shall at least experience as much pleasure as vexation on being brought to a knowledge of the truth.

It may now be well to conclude this long preface with a few words on the manner in which the following investigation has been conducted. The author's first endeavour, after discovering the principal affinities, was to ascertain the connexion that might exist between the general structure of the animal and its manner of living. This in many cases, from our ignorance of physiological entomology, was impossible; but in the organs of manducation the author conceived himself in no danger of violating the order of nature, by examining whether the texture and form of these bore any regular relation to their uses, and more particularly to the quality of their food. Such a plan, it was true, came in direct opposition to that of the celebrated naturalist[a], who has laid it down as a rule, that we ought to take the character from the conformation alone, and not from any property or habits the exercise of which is momentary. But the mere authority of a name, however distinguished, could never shake the author's belief in a truth so apparent, as that the conformation of an organized being was originally ordained by nature subservient to and dependent upon its habits and manner of living; and that therefore to study for purposes of arrangement the structure of an organ, without considering its use to the animal, is as if we were, on comparing the merits of different pieces of mechanism, to examine the form and count the number of teeth in a wheel, without bestowing a thought on the functions which this may perform in the whole machine. Besides, that such a plan in Entomology is contrary to that of nature, was evident, by the best work in the science having been pursued on a totally different system.

And here the author cannot refrain from expressing the extraordinary obligations which he owes to the works of the Baron DeGeer, a man whom he must ever consider as the first entomologist that has hitherto lived, and whose *Mémoires,* modestly entitled *pour servir à l'Histoire des Insectes,* comprise a fund of observation and acute reasoning, which they who cultivate this engaging science must hope rather to develope than to augment. An independent spirit, which prompted DeGeer to refuse obsequious submission to the authority even of Linnæus, and an utter absence of any partiality for nomenclature, seem, with a strong natural feeling for the observation and arrangement of facts, to have been the principal causes of the excellence of that work, to which the author must refer those who may wish to enter perfectly into the spirit of the following remarks.

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[a] Cuvier, *Regne Animal,* vol. i. p. 8.

For the better understanding of any anatomical terms that may be used, he would also recommend the perusal of the article *Bouche*, in the *Dictionnaire d'Histoire Naturelle*, now in the course of publication at Paris, in which the reader will find the structure of the mouths of insects explained with great skill by M. Latreille. And by the study of this article, with the further assistance of the plates with which the Horæ Entomologicæ have been adorned by the most able entomological artist in existence, the author hopes that his ideas may be followed sufficiently to prevent him from being subject to misconstruction.

EXPLANATION OF PLATES.

A. *Antenna.*
B. *Labrum.*
  b. *Hinder margin.*
  c. *An excrescence, which I suspect to be the consequence of disease in the specimen examined.*
D. *Mandibula.*
  d. *Outer side.*
E. *Maxilla.*
  e. *Maxillary feeler.*
F. *Mentum.*
  f. *Stipes.*
  *g. *Labial feeler.*
  h. *Labium.*
  i. *An excrescence, which I suspect to be the consequence of disease in the individual examined.*
N. *Clypeus.*
  n. *Fore margin.*
  o. *Eye.*

Fig. 1. *Hister maximus.*
  2. *Lamprima aurata.*
  3. *Paxillus crenatus.*
  4. *Passalus interruptus.*
  5. *Chiron digitatus.*
  6. *Nigidius cornutus.*

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* This is imperfect in fig. 17.

Fig. 7. *Ægus chelifer.*
8. *Sinodendron cylindricum.*
9. *Hybosorus Arator.*
10. *Elephastomus proboscideus.*
11. *Athyreus bifurcatus.*
12. *Acanthocerus æneus.*
13. *Phoberus horridus.*
14. *Cryptodus paradoxus.*
15. *Mæchidius spurius.*
16. *Chalepus geminatus.*
17. *Dasygnathus Dejeanii.*
18. *Amblyterus geminatus.*
19. *Pelidnota 6-punctata.*
20. *Rutela Lineola.*
21. *Macraspis 4-vittata.*
22. *Chasmodia viridis.*
23. *Platygenia Zairica.*
24. *Gymnetis nitida.*
25. *Sérica brunnea.*
26. *Euchlora viridis.*
27. *Areoda Leachii.*
28. *Oplognathus Kirbii.*
29. *Anoplognathus viridi-æneus.*
30. *Anoplognathus dytiscoides.*
31. *Leucothyreus Kirbyanus.*

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CORRIGENDA.

Page 32, line 14, for *circles* read *circle.*

—— *ib.* —— 19, for *Recticera* read *Rectocera.*

—— 40, —— 4, for *tarsi* read *tibiæ.*

—— 59, —— 8, for *replace* read *supply.*

—— 61, —— 9, after *which* add *with the exception of Lethrus.*

—— 69. Erase note *b* at the bottom of page, because a late examination of the genus Hexodon has proved that it cannot with propriety be inserted among the Rutelidæ.

—— 102, line 5, for *exponendum* read *exponendam.*

—— 113, —— 14, for *at generi Dorco* read *ad genus Dorci.*

HORÆ ENTOMOLOGICÆ.

CHAPTER I.

INTRODUCTION.

It has long since been stated that those organs, whether in the Animal or Vegetable Kingdom, which tend to the reproduction of the species [a], in reality compose the essence of its being; or, in other words, that the chief object of the existence of the individual is to bring these to maturity. The truth of this assertion has been supported by the remark, that the vital principle begins to decay throughout organized matter, as soon as the abovementioned organs cease to be able to perform their functions. It has also been urged, that as Fructification forms the great basis of arrangement in Botany, so considerations founded on the reproduction of the species ought to afford the most natural method of classifying the Animal Kingdom. But without discussing the accuracy of this mode of argument, it were useless to enter into the various objections—the various difficulties that such a system would be exposed to; objections and difficulties that render it absolutely necessary to inquire after some other principles of arrangement. Now, if we lay aside the reproduction of the species, undoubtedly the chief remaining function of life is its preservation in the individual [b]; for indeed it has been questioned by some naturalists, which of the two ought to be considered the more important. The organs, therefore, tending to the preservation and nutrition of the individual, are those to which we must, in preference to all others, apply ourselves, when searching for the path Nature may have pursued in the distribution of animal life. These are not only, as will hereafter be shown, less liable to variation, when viewed in a general manner; but, on the other hand, are subject in detail to all those endless changes of form, which must depend on the variety of methods which beings endowed with animal life are obliged to use for the purpose of prolonging their existence. Thus Savigny has most ingeniously shown that one general plan of construction is visible throughout the mouths of Insects, while the parts of which they are composed put on an infinite diversity of form.

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[a] *Monog. Apum Angliæ*, vol. i. page 39.

[b] "Dass den Mundtheilen unter den übrigen Theilen des Insekts eine vorzügliche Aufmerksamkeit gebührt, bedarf wohl keines ausführlichen

But there is another reason why we should prefer the study of these organs to that of others which have been used by entomologists in the formation of their numerous Systems, namely, that they are, with the exception of the organs of sight and locomotion, the only parts of an insect of which we absolutely comprehend the use. The func-

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beweises. Sie sind die Werkzeuge, auf denen die Erhaltung des Thiers beruht. Nach den verschiednen Arten der Nahrung, die dem Thiere bestimmt ist, sind sie verschieden eingerichtet; sie enthalten gewôhnlich alle Werkzeuge zum Habhaftwerden der Speise, und zu der stufenweisen Vorbereitung derselben, bis zum Uebergange in den Schlund beieinander, und die Arten dieser Vorbereitung sind so mannichfach wie die nahrungstoffe, auf die sie angewandt werden, und wie die Bestimmung des Insekts selbst, in dem grossen Haushalte der Natur. * * * Welche Menge von Zurüstungen fordert diess alles! Selbst Sinneswerkzeuge sind unter die Mundtheile gesetzt; und bei diesen verschiednen Bestimmungen, bei der oft grossen Zahl von Theilen gewähren sie einen Reichthum von Merkmalen, der für die Unterscheidung höchst willkommen sein muss." *Ueber das Fabricische System. Mag. für Insekt.* von Illiger. i. 261.

tions of the antennæ even to this day are unknown[a]; and possibly may continue so, as there is no reason why an animal, whose general construction is so different from our own, should not possess sensations with which we must for ever remain unacquainted. The same may in some measure be said of the Elytra, Wings, Sternum, Scutellum and Tarsi, organs which are either not to be found, or if found, are by no means analogously constructed in the *Vertebrata*, the only animals to which with propriety we can refer our own sensations. Nevertheless, all these parts of an insect have been made use of in their turn for purposes of general arrangement; and it is undoubtedly true, that no divisions, or rather no *affinities*[b], can be more natural than such as are often pointed out by some of these organs; as for instance, the antennæ. Of the truth of this remark it will be seen that the Lamellicorn Insects afford a very striking example. But an implicit confidence for purposes of classification in any solitary anatomical part, or even in the organs of manducation themselves, must be objected to. We ought to proceed with care, assuming no principle of arrangement as fixed, and nothing as fixed in arrangement itself, except so far as we may be sure that our conclusions agree with what may be observed in nature.

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[a] It is probably on some account like this that Fabricius passes such a sweeping condemnation on the use of the antennæ in the formation of genera: "Antennæ ad characteres generum vix usurpandæ." *Phil. Ent.* p. 130.—"Antennæ ad generum characteres minus valent quam plurimi estimant." *Ibid.* p. 94.

[b] The French naturalists make use of the expression *coupes naturelles* as we are accustomed to speak of sections and natural genera. But however correct all this may be in practice, it has certainly given rise to many erroneous ideas; as it is difficult to conceive why genera should have been imagined to exist in nature, until we had previously familiarized ourselves with the term *natural divisions.* As matters now stand, in endeavouring to discover divisions instead of affinities, we make use of an artificial method instead of a natural one to arrive at—Nature.

It appears to me, however, as a principle unobjectionable in itself, that the adoption of any organ, not immediately connected with the sexual difference, for purposes of generic arrangement, ought to be in an inverse proportion to the difference of that organ in the sexes. So that when we find the form of the mandibles, for instance, to differ in the sexes of the genus *Lucanus*, we ought to choose some other test by which we may distribute these insects into natural groups.

I shall perhaps be more clearly understood from the inspection of the following table, in which I have attempted to class, according to their degree of variation as to form or number, first in the sexes, and secondly in the species, all the various organs which have been the *keystones* of different systems. This table, however, is to be considered with reference to the Coleopterous insects only.

	In the Sexes.		In the Species.	
	As to Number.	As to Form.	As to Number.	As to Form.
Capitis Thoracisque Cornua vel Gibberes	variable	variable	variable	variable
Alæ	variable	....	variable	variable
Tarsorum Articuli	variable	variable	variable	variable
Pedum Ungues	invariable?	invariable?	variable	variable
Scutellum distinctum	invariable	invariable	variable	variable
Sternum productum	invariable	invariable	variable	variable
Palpi	invariable	variable?	variable	variable
Antennæ	invariable	variable	invariable	variable
Pedes	invariable	variable	invariable	variable
Mandibulæ	invariable	variable	invariable	variable
Mentum	invariable	invariable?*	invariable	variable
Oculi	invariable	invariable	invariable	variable
Maxillæ	invariable	invariable	invariable	variable

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[a] It is possible that the form of the mentum may be found to differ in the sexes of some of the Linnæan *Lucani*.

It may be seen from this table, that there are four modes at least in which the parts of an insect may vary; and as the great difficulty of making use of an organ in arrangement must depend on the irregularity and confusion which arise from the interference with each other of these several modes of variation, it follows that those parts are the best calculated to serve as the basis of classification which vary in the least number of different ways. Hence we are led to conclude, that the *mentum, oculi,* and *maxillæ* are the parts of an insect which are the most to be attended to in our endeavours to arrive at a natural system. But the first and last of these are very much preferable, for the attainment of our object, to the eye; inasmuch as the variation of the form of this organ in different species is by no means so easily seized.

If however I have laid peculiar stress on the modifications of the maxillæ[a], I wish to be understood as by no means undervaluing those characters which may be drawn from the more obvious parts of an insect. Such characters, indeed, once that the chain or order of nature is discovered and established, are the most useful, because the ordinary observer can by their means arrive at the same conclusions with the anatomist, without giving up the time and attention requisite for the dissection of the parts of the mouth. At the same time we ought to be very careful in the use of artificial characters; and to recollect, that in natural history we have always good reason for suspecting *methods*. Indeed, the interests of science and that love of truth which every scientific man ought to possess, require that we should not allow ourselves to be dazzled by the seeming simplicity of rules, so far as to overlook the cases where these rules interfere with the evident order of nature. I am induced the rather to make this observation, because I have long felt that the system adopted by Geoffroy, Dumeril and Latreille, of arranging insects according to the number of joints in their tarsi—a system now in very general use, owing to the unrivalled reputation of the last-mentioned entomologist—is by no means natural[a]. By the inspection of the foregoing table it will appear, that few characters are so variable as those drawn from the tarsi, and consequently few so objectionable for general use; though it must be granted, that in particular tribes these organs may safely be used for generic distribution. The consequence, however, of making primary divisions after the number of joints in the tarsi, has been, that many genera have been separated and thrown at an immense distance from the true place assigned them in nature. Among numberless general instances of which evil it will only be necessary to note the affinity between the *Psephalidæ*, Leach, and *Staphylinidæ*, Kirby, the genera *Cis*, Lat. and *Anobium*, F.,

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[a] "Maxillam constantissimam invenimus, vix in congeneribus aberrat." *Phil. Ent.* p. 93.—"Maxillæ et labium ejusdem speciei tunc constantissima semper simillima." *Ibid.* p. 94.

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[a] " Ce n'est pas assez pour pallier les fréquentes anomalies qui se rencontrent, de dire que tel insecte a cinq articles aux tarses quoiqu'on n'en découvre que quatre. Il devroit en effet en avoir cinq d'après la règle qu'on a établie. Cependant ces explications, toutes ingénieuses qu'elles sont, ne peuvent me convaincre, et je ne puis me déterminer à supposer plus d'articles aux tarses qu'on ne peut réellement en découvrir, en y mettant toute l'attention possible. Le nombre des articles doit être clair, positif et uniforme, sans quoi le caractère est vacillant. Au reste, je ne disconviendrai pas que sans être rigoureusement propres à diviser les ordres, ils ne puissent très-bien servir pour un tableau dans lequel les genres seroient ordonnés selon le nombre des articles des tarses."—*Ent. Helvetique*, p. 30.

Nilio, Lat. and *Coccinella,* L. &c., and to observe their respective places in the latest systematic works on Entomology. But two cases which affect the natural arrangement of the Lamellicorn insects, though in different ways, must particularly be mentioned. We have the genus *Trachyscelis,* Lat. inserted among other heteromerous insects, and separated from *Ægialia,* Lat. to which it is so nearly allied both in anatomy and habits. Again: it seems difficult to conceive why the genus *Sinodrendron,* F. should be so much further removed from the *Bostrichidæ* than a *Curculio,* L. to which these have evidently much less resemblance.

In several cases also the number of articulations in the tarsi varies even in the sexes, which peculiarity Gyllenhall on the indication of Müller observed in several species of the genus *Cryptophagus,* as for instance, in his *C. fumatus* (*Corticaria fumata,* Ent. Brit.); and I have myself observed this curious and interesting difference of the sexes in *Cryptophagus pallens* (*Tenebrio pallens,* Ent. Brit.), an insect by no means uncommon in England[a]. I state these circumstances not as reasons for rejecting the tarsi altogether in arrangement, but as proving how little they are to be depended on as the ground-work of primary divisions or families.

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[a] "Detexit acutissimus Müller pastor Odenbachensis in genere Cryptophagorum, sexui uni esse sæpe quatuor, sexui alteri semper quinque articulos tarsuum in pedibus posticis; et jam observarunt, tum entomologus consummatissimus Dom. Doct. Illiger, tum laudatus Müller, plurimas parvorum Dytiscorum species, quas cum nominatis auctoribus ad genus Hyphydrum referimus, solummodo anteriorum pedum habere articulos tarsuum quatuor, postici vero pedum paris quinque, unde Cel. Illiger ex hoc genere peculiarem subdivisionem jure formavit;' (vid. Illig. Mag. tom. i. p. 299.) quum vero in ceteris proximâ affinitate Dytiscis jungatur illud genus, proxime ab eis id inserui notatâ tantum hac diversitate." Gyllen. *Ins. Suec.* (Præf.) Vol. i. p. v.

Again: "Singularis valde et inexspectata est observatio a Dom. Müller in Illig. Mag. iv. p. 214, allata quod tarsi postici in altero sexu plurium specierum hujus generis tantum 4-articulati sunt; *hoc tamen verum esse in hac specie et nonnullis insequentibus observavi.*"—Gyllen. *Ins. Suec.* p. 168.

In discussing the use of particular parts of an insect for purposes of classification, the *sternum* deserves some degree of consideration, as we find it often assuming, in the *Lamellicornes*, Lat. a very peculiar character, which appears in some measure to correspond with their manner of living; but the use of this part of the insect has hitherto been undiscovered. We may, however, arrive near the object of our wishes on this subject, by considering the construction of this organ, and the manners of the various insects which possess it. On dissecting a lamellicorn insect it will be found, that on the inside and from the lower extremity of that ring of the abdomen which is known to entomologists by the name of *pectus*, there rises upwards obliquely a long crustaceous triangular pyramid, the apex of which is fixed to the abovementioned extremity. This pyramid has the lateral angles of its base very acute, and is the proper sternum of the *Lamellicornes*, Lat. composing indeed the whole of it in nearly all the *Scarabées de terre* of De Geer: but in many of the other division, composed of insects which feed on living plants, and which I have therefore called *Thalerophaga*, we find that the lower acute edge of the pyramid is joined to the breast by a thin crustaceous plate, the extremity of which appears produced externally between the first pair of legs into what is commonly called the *sternum productum*[a]. If we examine a longitudinal section of it under this form, as in the genus *Anoplognathus,* Leach, a construction is to be discovered which may be compared to the keel of a ship, or still better to the sternum of a bird; and the organ, no doubt, serves for some analogous purpose to all insects whose flight in the air or progress in the water Nature intended should be rapid. This *keel* must be a great advantage to every Coleopterous insect possessing it, and particularly to the bulky *Lamellicornes,* as materially contributing to balance the inconveniences that may arise from the obstruction of their wings by the superincumbent elytra, their greater specific gravity, and the blunt broad surface which they expose to the resistance of the air in flying—inconveniences that insects of the other orders, with the exception of the *Orthoptera,* are in no degree subjected to. The forked base of the pyramid which I have described is supported by strong muscles attached to the sides of the body, and thus appears to serve for another use, namely, the support of the intestine. This organ, which in the *Petalocera,* Dum. is long and cylindrical, passes close to the back of the insect, directly over the forked base of the prism. But whatever the use of the sternum may be, the above table will sufficiently show that it is not well adapted to be a principle of classification.

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[a] Fabricius appears to have been acquainted with this external process of the sternum only. "Sternum linea pectoris longitudinalis, sæpe antice posticeque mucronatum, differt quoad proportionem, apicem."

The next organ which demands our attention is the *scutellum;* not as being in itself of importance, but because Geoffroy's arrangement of the Linnæan genus *Scarabæus* has been founded on it. It is sufficient to state, in order to prove the absurdity of using this character for great divisions, that the accurate distinction is not, as has been supposed, whether the scutellum does or does not exist in a lamellicorn insect, but whether it is or is not distinct.

There are several other parts of an insect which, like those I have just considered, might be made use of to prove how erroneous is the idea of assuming any particular organ as the sole source of the *Essential Character*[a]: but I trust the above will be sufficient. Natural History is the science of comparison;—to trace affinities, to weigh distinctions, and to compare characters, are the three principles upon which the whole knowledge of a naturalist hinges; and so true is this position, that the earliest authors who have made Nature the object of their study have been obliged to use a classification rude indeed, as might have been expected, but not the less satisfactorily proving that Natural History is of all the branches of human knowledge, that which the most requires the arrangement of our ideas. The very naturalists—such as Buffon, Reaumur, and Bonnet—who despised scientific nomenclature, were obliged to attend to classification; and the reason was evident. Nomenclature, it must always be understood, is artificial; and once that a natural group was indicated, it mattered little whether this group had a name, unless it was for the purpose of assisting the memory[b] and connecting the chain of reasoning. Entomologists therefore, who never studied Nature in books, but

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[a] It is not to the Essential Character itself, as defined by Fabricius, (*Phil. Ent.* p. 96,) that I object; but to the impossibility of finding such. "Character essentialis optimus facillimus at vix possibilis." Why then trouble ourselves with hunting after a chimæra?

[b] The almost exclusive attention which has of late years been unfortunately lavished on *Nomenclature* and *Systematic Arrangement*—on the means in short, and not on the end of the science—has with ignorant persons diminished the importance of the study of Natural History itself. Let us hope that the slur will be soon entirely obliterated by those naturalists who have already shown that they are not to be deterred from the investigation of affinities by great names, because, forsooth, these may have preceded them in the annals of science.

compared her with herself, and that in a few objects which could easily be comprehended without resorting to subdivision, would naturally set little value on names, while on the other hand the very object of their pursuit was the investigation of affinities. No distinct ideas of an organized being could indeed be formed in one's own mind, much less communicated to that of others, except by first comparing the several parts with those in some other and well known organized being; and secondly, by the comparison of the two wholes. This process, so necessarily and so unconsciously adopted by persons the most ignorant of natural history, is nevertheless a rude species of classification. The disposition to classify is then natural to the human mind; and that organized beings have in some manner been arranged in nature, this disposition, if allowed to act freely, will soon discover. But, unfortunately, it is not so easy to agree upon the method in which organized matter was disposed at the creation; and every naturalist, in attempting to find the natural system, has only added an artificial one to the hundreds that had already been proposed. In Botany indeed Linnæus most happily founded his artificial system on the parts of fructification—organs which are perhaps the most important in the natural system. The consequence was, that the Linnæan groups in botany were not so wholly different from the more modern ones, which had their origin in a multitude of other though less essential characters combined with the former. It has not, however, been so with Entomology[a]. Linnæus commenced with a system entirely artificial; and almost every author previous to Latreille, while he altered the principle, followed Linnæus in the details of arrangement. Hence arose the abuse of the *Essential Character*; a term excellent and useful in the abstract idea given of it by Linnæus and Fabricius, but which, being founded on one or two favourite parts only of the insect, soon became little else than a magical name for each principle of classification, whatever this might have been, and from which the entomologist fancied Nature could make no appeal. One author accordingly made use of the antennæ alone for his system; another of the tarsi; and a third of the *instrumenta cibaria:* and each, according to his own plan, took his essential character solely from the modifications of the favourite organ which he had chosen to be the keystone of his system. It will therefore cease to excite surprise that Entomology, generally speaking, should be still in its infancy. The French entomologists have, it is true, made use of a system founded upon and combined of all the parts of an insect. Yet, by supposing Nature to have been absolutely governed by a set of rules which they themselves laid down, and by scarcely allowing the possibility of her making exceptions to these rules, they have done little more by their innovations, than given to the world an additional artificial system.

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[a] "Examinavi tantam scientiarum tam affinium diversitatem; et in illa omnia firma, certa, in hac vero omnia vaga inveni.—Certitudinem hanc Botanices regulis fixis bene stabilitis niti observavi, quum e contrario in Entomologiâ omnino nullæ sancitæ."—*Phil. Ent.* (Præf.)

CHAPTER II.

ON THE ACTUAL STATE OF OUR KNOWLEDGE WITH RESPECT TO THE CLASSIFICATION OF THE LINNÆAN SCARABÆI.

M. Latreille has lately, in the third volume of the *Regne Animal* of M. Cuvier, and also in the new edition now publishing of the *Dictionnaire d'Histoire Naturelle*, applied the name of *Lamellicornes* to an artificial division comprising all the insects which compose the genera *Lucanus* and *Scarabæus*, as they were left by Linnæus in his last edition of the *Systema Naturæ*. Indeed the connexion between these genera is so evident, that in the *Fauna Suecica* and the ten first editions of the *Systema Naturæ* we find them combined under the general name of *Scarabæus;* and even now it is difficult, nay even impossible, to consider them separately, without overlooking several important characters and curious properties which belong to both. This difficulty may in some manner account for a wider range being taken in this investigation than seems necessary for the original purpose I had in view. The central object of the following remarks is nevertheless still the genus *Scarabæus* of the twelfth edition of the *Systema Naturæ*; and if I touch on the genus *Lucanus*, it is only so far as is rendered necessary by the abovementioned affinity. The genus *Scarabæus* then, as it was constituted by the learned Swede in the later editions of his immortal work, consisted of *Coleoptera antennis clavatis, capitulo fissili*[a]; while the genus *Lucanus*, which owed its origin to Scopoli, in the *Entomologia Carniolica*, was described by Linnæus as *Coleoptera antennis clavatis, clavâ compressâ latere latiore pectinato-fissili*[b]. The latter genus, which is certainly better defined thus, than it originally was by Scopoli[c], seems to have also had the advantage in this respect over the Linnæan definition of *Scarabæus*, as the peculiar character of the antennæ of this last group can hardly be said to have been in the above words correctly described. Linnæus also divided the *Scarabæi* into groups depending upon the horns and protuberances of the head and thorax; but it was unfortunate that he could hardly have pitched upon a more variable or artificial character, as will readily be perceived by inspecting the table given in the introductory chapter.

Not content with the separation of the *Lucani* from the genus *Scarabæus*, Scopoli attempted another but less useful innovation, in distributing the insects of the latter genus according to the number of spines or teeth on the fore-legs; but this method was even worse than the previous one of Linnæus. Scopoli, however, proposed two other methods of arrangement, one according to the number of articulations in the *clava* of the antennæ[d], and the other according to the manners of the different insects themselves[e]. The first plan is clearly artificial, and even erroneous, as in the case where he conceives that there exists any truly bifid *clava* among the *Lamellicornes*. But the second is so deserving of our attention, from being the first attempt ever made to arrange these insects naturally, that I shall give it at length.

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[a] Linn. *Syst. Nat.* vol. i. p. 541. ed. 13.

[b] *Ibid.* p. 559.

[c] "Antennæ apice dentibus quatuor, uno latere pectinatæ." Scop. *Ent. Carn.* 1. But this character would almost restrict the genus to *Lucanus Cervus.*

[d] Scop. *Ent. Carn.* 2.

[e] *Ibid.* 3.

"*Scarabæi Floræ famuli.*"

"*Anthophylli, nuptias plantarum promovent; auratus, nobilis, maculatus, littoralis, figulus, argenteus, libator, squalidus, alpinus, variegatus.*

"*Phyllophagi, larvas Lepidopterorum fugant; melolontha, eremita, nasicornis, solstitialis, oblongus, minimus.*

"*Stercorei, radices plantarum nutriunt; stercorarius, vernalis, lunaris, fimetarius.*"

The errors are obvious. But still this plan, faulty and fanciful as it was, must be allowed to have been the nearest approach hitherto made to truth, and the deepest penetration into that part of Entomology which is really the province of the naturalist.

De Geer has the honour of having been the first to perceive all the advantages to be derived from the mode of arrangement indicated by Scopoli. But, sensible of its imperfections, he instituted a new method of division, which was truly worthy of this great physiologist, and remains a striking proof of the advantage which he, in studying the manners of these insects, had over those who were content with describing them from their cabinets[a]. His method of distribution was into three families, as follows:

1. *Scarabées de terre.*
2. *Scarabées des arbres.*
3. *Scarabées des fleurs.*

Oryctes and *Trox* were thus no longer, as by Scopoli, made phyllophagous insects; and many other discrepancies were avoided[a].

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[a] In this case, at least, De Geer has shown the futility of Fabricius's opinion, "Nimis vero habitui adhærere est stultitiam loco sapientiæ invenire."

In the interval between the publication of the *Entomologia Carniolica* and De Geer's sixth volume, and probably without the knowledge of either work, Geoffroy divided the original Linnæan genus *Scarabæus*, by the separation from it of the exscutellated insects under the name of *Copris*, and of those composing Scopoli's genus *Lucanus* under the name of *Platycerus*. The institution of the genus *Copris* was in some degree an improvement, though founded on such bad characters, that coprophagous insects, such as those forming Latreille's family of *Geotrupini*, were put in the same genus with *Cetonia*, from which they were obviously distinct, once that the necessity was seen of carrying the investigation further among the *Lamellicornes* than was allowed by that first principle of affinity, the form of the antennæ.

Fabricius, sensible of the heterogeneous composition of Geoffroy's genus *Scarabæus*, broke off[b] from it the genera *Trox*, *Melolontha*, *Cetonia*, and *Trichius*[c]. The three first are natural groups, that show how correct was the eye of this great man in seizing generic distinctions. I say "the eye," because it is worthy of remark, that the characters given to these several divisions in his *Genera Insectorum* prove that he had consulted his newly invented method of investigation but little in their formation. It ought also to be remembered, that the genera *Melolontha* and *Cetonia* had already been indicated by De Geer, and that the union of Geoffroy's genus *Copris* with *Scarabæus* in the *Systema Entomologiæ* was a retrograde step in the science, which many years afterwards the entomologist of Kiel found it necessary to correct[a]. One advantage, however, attended the formation of the Fabrician genus *Scarabæus*, which was, that the connexion between the insects afterwards named *Geotrupes* by Latreille and Geoffroy's genus *Copris* was thereby re-established.

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[a] De Geer was also aware of the true place of *Hister*, and its intimate connexion with *Lucanus*.—De Geer, *Gen. Ins. Retz.* p. 18.

[b] *Systema Entomologicæ*, I. xi.

[c] "The organs of manducation in this genus resemble those of *Cetonia* so much, and indeed the affinity throughout between these genera is so great, that one is surprised how Fabricius should have separated them at such an early period of his career."—*Oliv.* vol. i. no. 6. p. 1.

Olivier was aware of the imperfection of Geoffroy's genus *Copris*, and therefore adopted the genus *Scarabæus* of Fabricius, with all his other genera except *Trichius*; for which omission he gives sufficient reasons, considering the state in which entomology then was.

This French naturalist also divided the Fabrician genus *Scarabæus* as follows:

1. *Les Scarabées qui ont des mandibules, et qui n'ont point de lèvre supérieure.*
2. *Les Scarabées qui ont des mandibules, et une lèvre supérieure.*
3. *Les Scarabées qui n'ont ni mandibules ni lèvre supérieure.*

These three groups are strictly natural; and making allowance for the incorrectness of the principles on which the above distinctions were founded, Olivier may be said to have brought the natural history of De Geer's *Scarabæi terrestres* to the state in which it now stands. For if we except the names bestowed on the foregoing three divisions of the Fabrician genus *Scarabæus*, and the more precise anatomical characters given to them in Latreille's *Genera Insectorum*, it will be found that the arrangement of this branch of the *Lamellicornes* has since undergone but little further improvement. Latreille has indeed combined Olivier's "*Scarabées qui ont des mandibules sans lèvre supérieure*" with the "*Scarabées des arbres*" and the "*Scarabées des fleurs*" of De Geer, under the general name of the family of *Scarabeides:* but it is difficult to perceive the advantages derived from this alteration; and it may even be questioned whether in several instances it be altogether conformable to nature. The publication, however, of the *Précis des Genres* conferred, by the distribution of insects into families, the most signal benefits on this as well as on every other branch of entomology. In this work Latreille divides the *Lamellicornes* into two families, which answer to the genera *Lucanus* and *Scarabæus* of Linnæus; and these he again subdivides into genera. He also gives the names *Scarabæus* and *Geotrupes* to Olivier's first and second divisions of *Scarabæi*, and restores the Geoffroyan genus *Copris*, while this as well as all the other genera are infinitely better defined than ever they were before. In the *Histoire Générale des Crustacées et des Insectes*, the same author establishes four families, viz. *Lucanides*, *Scarabeides*, *Geotrupini*, and *Coprophagi*. The same plan is pursued in the *Genera Crustaceorum et Insectorum* and in the *Considérations Générales*. But in the last two works these four families are united into one group, to which he afterwards gave the name of *Lamellicornes*. It remains now only necessary to mention the institution of the genus *Aphodius* by Illiger, of *Rutela*[a] and *Glaphyrus* by Latreille, as alterations that bring our general knowledge of the lamellicorn insects to the state in which it is at present. Many other valuable genera are indeed to be found in the various works of authors[a]; but, with the exception of the genus *Anoplognathus* of Dr. Leach, they add but little to our general knowledge with respect to the arrangement of the Linnæan *Scarabæi*.

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[a] *Suppl. Ent. Syst.* p. 28.

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[a] The genus *Rutela* was indicated by Olivier. *Ent.* i. no. 6. p. 4.

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[a] *Lethrus*, Scopoli; *Hexodon*, Oliv.; *Gymnopleurus*, *Oryctes*, *Hoplia*, Illiger; *Cremastocheilus*, Knoch; *Goliath*, Lamarck; *Onitis*, Fab.; *Ateuchus*, Weber; *Sisyphus*, *Onthophagus*, *Ægialia*, *Amphicoma*, *Anysonyx*, Latr.; *Psammodius*, Gyll.; *Geniates*, *Apogonia*, *Bolbocerus*, Kirby.

CHAPTER III.

ON THE NOMENCLATURE OF THE LINNÆAN SCARABÆI.

THE preceding chapter may be considered as containing a brief but pretty accurate outline of our knowledge with respect to the classification of this very important branch of entomology. M. Dumeril has indeed distributed the *Scarabæi* of Linnæus into *Petaloceri* and *Prioceri*, the first of which names I have for convenience adopted, though neither of them express any thing but the genera *Scarabæus* and *Lucanus* as they exist in the later editions of the *Systema Naturæ*. The term *Prioceri* seems even to be so far objectionable, that serrated antennæ by no means, as will be shown, constitute the precise natural character of the division[a]. There are also some other changes or rather reforms (for it seems hard to call that an innovation which has the right of priority to support it) which appear absolutely necessary; and the explanation of this truth will form the principal subject of the present chapter.

Scarabæus[b] appears to have been originally the name used by the Romans to designate the Coleoptera[a] in general, as *Κάνθαρος* might have done among the Greeks. It may also be understood as having embraced some Orthoptera, such as the genera *Acheta* and *Gryllotalpa*[b]. Pliny, however, gives a particular description of the sacred beetles of the Egyptians under this title[c], and it was accordingly restricted to these remarkable insects by Mouffet and the earliest modern naturalists. The name *Scarabæus* has in truth had so many different applications given to it, that it would seem above all others to be that which for ever ought to remain undisturbed. Linnæus, Scopoli, and their immediate followers may nevertheless be considered as the only persons who properly applied it; and Geoffroy, in giving the name of *Copris* to the exscutellated insects, may be said to have been the primary cause of all the uncertainty and changes to which the name *Scarabæus* has since been subjected. Indeed, when this last was taken away from the above-mentioned celebrated insects of Pliny with which Linnæus had left it, it became a matter of indifference to what division of the *Lamellicornes* it was applied. We find therefore, that though Fabricius in the first

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[a] An additional reason for not adopting this word is, that Mr. Kirby has lately given the name of *Priocera* to a new genus in the family of *Cleridæ*.

[b] The origin of the word *Scarabæus* is not very clear; at least its derivation from *σκάπτω*, as given by Fabricius and Olivier, seems quite irreconcileable with the most common rules of etymology. To me it appears difficult to obtain the word at all from the Greek; and when we consider that it never occurs but in the Latin authors, there is little reason to doubt its being of Etruscan origin. If however it be a point of necessity that

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it should come from the Greek, it is most likely to prove the corruption of a Doric word, and the primitive may possibly be σκαριφάομαι from σκάριφος *penicillus*.

Σκαριφάομαι. ξύω, σκάπτω, γράφω, (*Hesych.*) scarifico, fodio.

Scarabæus for Σκαραφαῖος, as *balæna* from φάλαινα. In the same manner the Italians still say *escaravajo*.—The verb Διασκαριφῆσαι is also properly applied to the action of animals which scratch or dig up the earth with their claws.

[a] Plin. *Hist. Nat.* xi. 34. "Quibusdam pennarum tutelæ crusta supervenit ut Scarabæis."

[b] *Ibid.* "Alii focos et prata crebris foraminibus excavant nocturno stridore vocales." Which evidently applies to the crickets.

[c] *Ibid.* xxx. 30. "Scarabæum qui pilulas volvit. Propter hunc Ægypti magna pars Scarabæos inter numina colit."

edition of his *Entomologia Systematica* gave the name of *Scarabæus* to all the *Scarabæi terrestres* of De Geer, with the exception of those composing the genus *Trox;* and that therefore he comprehended under this name the true insects; yet in the *Systema Eleutheratorum* he gives it to the modern *Geotrupidæ* alone. As he had it in his power to apply the term properly when the genus *Ateuchus* was separated by Weber from *Copris,* it is to be regretted that so many excellent opportunities of rectifying the nomenclature should have been neglected. The alterations in systematical arrangement made by Olivier rendered it possible, and even easy, for him also to have assigned the name to its proper place. But unfortunately the Fabrician names were adopted where they ought not to have been; and the consequence is, that the naturalist points out as a *Scarabæus* an insect totally different from those known under that appellation to the antiquarian, the artist, and the scholar. Now it so happens that these mischievous changes have taken place in the quarter of all others the most conspicuous, and consequently are the most hurtful to the interests of entomology, as hardly any insect is to be reckoned so celebrated in antiquity as the true *Scarabæus.* On the ground then of priority of right, as well as of absolute necessity, the name *Scarabæus* is here restored to the *Ateuchus sacer*, Fab.; and to the genus *Scarabæus* of Latreille I have assigned the name *Dynastes*, in other respects always adopting the generic names of the last-mentioned entomologist[a].

There remains, however, still to be mentioned a peculiarity of nomenclature, which, though by no means original, or even new, is nevertheless I believe, with the exception of Mr. Kirby's *Century of Insects* in the 12th volume of the *Linnæan Transactions*, now for the first time generalized in entomology.

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[a] "Abstineamus a tali mutatione, quæ tantummodo confusionem et tandem ruinam scientiæ parit." *Philos. Entom.* p. 113.

In botany we often see the name of the family taken from that of the genus which is considered as affording more peculiarly the type of construction by which the former is characterized. In entomology also, Latreille has used the same plan; as when he names the family of *Geotrupini* from the genus *Geotrupes*, the family of *Scarabeides* from *Scarabæus*, &c. But, unfortunately, unless his work be kept constantly in the hand, we have no method of knowing from the name of a group whether it means a family, section, tribe, or any other of his numerous subdivisions. This is the natural result of his having neither generalized the abovementioned mode of forming *family names*, nor even their terminations[a]. To remedy this inconvenience I have followed the suggestion of Mr. Kirby, and designated families by the patronymic termination in *-idæ*, which, though not classically correct in the case where the primitive has a feminine termination, is nevertheless preferable to any other I have been able to devise, as well on account of uniformity as *euphoniæ gratiâ*.

With respect to the general principles of Nomenclature I have no remarks to offer, nor indeed would such a subject be altogether suitably introduced within the limits of a monograph. But it is really impossible not to express regret that so much mystery and importance should be attached to the formation of names; and that so many excellent naturalists should set no higher value on their time, than to employ it in disputing each other's titles to the invention of a few technical words. Natural history would indeed suffer but little injury were the prevailing ambition to invent new names altogether to cease; while it is not surely too much to expect that it might derive more advantage from a stricter investigation of affinities than that which is at present adopted. Nevertheless, such are not the sentiments of scientific men in some parts of the continent, particularly Germany, where entomology is truly a "war of words," and where to coin a barbarous name and to institute a new genus appear to be mistaken for one and the same thing. There are two facts difficult it seems in that country to be assented to, but which ought to be apparent at this time of day to every person who has paid any attention to the subject: First, genuine specific, nay even genuine generic distinctions do not constitute the *perfection* of natural science; and secondly, nomenclature is not a department of natural history, but only a convenient instrument whereby an acquaintance with it may the more easily be cultivated.

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[a] Count Hoffmansegg of Berlin has suggested an improvement in the termination of new generic names, the value of which will readily be understood by those who possess entomological cabinets. He proposes that the new name should always, if possible, be of the same gender with the genus to which the species originally belonged.

DISTRIBUTIO NATURALIS.

Insecta Coleoptera, Herbivora, antennis clavatis, capitulo plerumque 3-phyllo lamellato, pedibus fossoriis, tibiis externe dentatis vel spinosulis, duobus anticis præsertim, tarsis plerumque pentameris.

Lamellicornes } *Lat.*
Byrrhii }

- Insecta RECTICERA.
  - Lucanus } *Linnæus.*
  - Hister }
  - Antennæ fractæ, capitulo haud flabellato;
  - Mandibulæ valde exsertæ.
  - I. Saprophaga.
    - Hister, *Linn.*
    - Histeroides, *Gyllen.*
    - Histeridea, *Leach.*
    - Antennæ sæpius 11-articulatæ, clavâ compactâ.
    - Corpore convexo.
      - *Insecta adhuc incognita.*
      - Onthophilidæ?
      - Abreidæ?
    - Corpore depresso.
      - Omoleptidæ?
      - Histeridæ?
  - I. Thalerophaga.
    - Lucanus, *Linn.*
    - Lucanides, *Lat.*
    - Prioceri, *Dum.*
    - Antennæ sæpius 10-articulatæ, capitulo pectinato fissili vel subserrato.
    - Corpore convexo.
      - Lamprimidæ . . Lethrus.
      - Æsalidæ.
      - Syndesidæ.
    - Corpore depresso.
      - Passalidæ.
      - Lucanidæ . . Sinodendron.
- Insecta PETALOCERA. *Dumeril.*
  - Scarabæus. *Linnæus.*
  - Antennæ rectæ, capitulo flabellato;
  - Mandibulæ clypeo plerumque obtectæ vel raro exsertæ.
  - I. Saprophaga.
    - Scarabæi terrestres. *De Geer.*
    - Insecta materiis decompositis vel putrescentibus victitantia. Pedibus validis (posticis ab aliis subremotis), tibiis latis, elytris sæpius ad anum pertingentibus.
  - I. Thalerophaga.
    - Scarabæi florales } *De Geer.*
    - Scarabæi arborei }
    - Insecta materiis vivis vel vigescentibus victitantia. Pedibus gracilioribus, tibiis subangustis, elytris rarius ad anum pertingentibus.

		Character analogus.		
I. Coprophaga, vel succis excretoriis victitantia.	Geotrupidæ	Mandibulæ porrectæ corneæ . .	Rutelidæ.	I. Anthobia, florum vel arborum succis victitantia.
	Scarabæidæ	Mandibulæ membranaceæ	Cetoniidæ	
	Aphodiidæ	Maxillæ processu membranaceo	Glaphyridæ.	
I. Xerophaga, vel materiis siccioribus victitantia.	Trogidæ	Maxillæ dentatæ Mandibulæ acutiusculæ laniatores	Melolonthidæ.	I. Phyllophaga vel folia mandibulis rodentia.
	Dynastidæ	Maxillæ dentatæ vel inermes . . Mandibulæ obtusæ molares vel incisoriæ	Anoplognathidæ.	

CHAPTER IV.

ON THE NATURAL AFFINITIES WHICH THE LINNÆAN SCARABÆI BEAR TO EACH OTHER.

THE preceding general arrangement was obtained in an attempt to combine the anatomy with the *habitus* of insects, and more especially by considering their organs of manducation with a continual reference to the manner of living. This method of considering entomology, besides the very questionable merit of novelty, possesses no small portion of interesting facts in its developement, as the following observations will prove.

The herbivorous pentamerous Coleoptera[a] *which have clavate antennæ, and their anterior tibiæ externally spinose or dentated*[b], that is all the *Lamellicornes* of Latreille, together with the Linnæan genus *Hister*, may be divided into two branches, viz. *Rectocera* and *Petalocera*, which are simply to be distinguished thus—the former by antennæ as it were broken, and the latter by having them straight, or at least forming no sharp angle in their extent.

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[a] I had originally, for the sake of convenience, comprised all these insects under the general name of *Acanthopoda*; but was subsequently induced to cancel it, from a fear that it might give rise to erroneous notions of *division*. For it is not to be imagined that the *Acanthopoda* could have represented any natural division, since their extreme genera may be shown to be connected with other *Coleoptera* in as intimate a manner as we shall see that they are among themselves. The *Acanthopoda*, therefore, could only have been considered as forming four links in a chain, and not as an insulated tribe.

[b] This definition is a good instance of the difficulty of finding characters

I shall for the present confine my remarks to the *Petalocera*. These appear to branch out into two columns of five families each; one of the columns consisting of *Saprophagous insects,* or such as feed on putrid or decomposed vegetable matter, and the other of *Thalerophagous insects,* or such as live on green or fresh vegetable food. The saprophagous column answers to the "*Scarabées de terre*" of De Geer, and the *Scarabées des fleurs et ceux des arbres* of the same author are both comprised under the name of *Petalocera thalerophaga*. It is also observable that each column consists of two groups; the first, of insects which have membranaceous maxillæ, and therefore live on juices, and as it were by licking their food; and the second, of insects which have corneous or crustaceous maxillæ, and therefore live on a more solid species of food, and by mastication.

It will next be remarked, that the families in one of these columns have each a striking similarity of general form to the corresponding families in the other column: thus the *Rutelidæ* and *Geotrupidæ* have their body in general subconvex; the *Scarabæidæ* and *Cetoniidæ* have it generally depressed; the *Aphodiidæ* and *Glaphyridæ* less so; the *Trogidæ* and *Melolonthidæ* have it very convex, while the *Dynastidæ* and *Anoplognathidæ* have this sort

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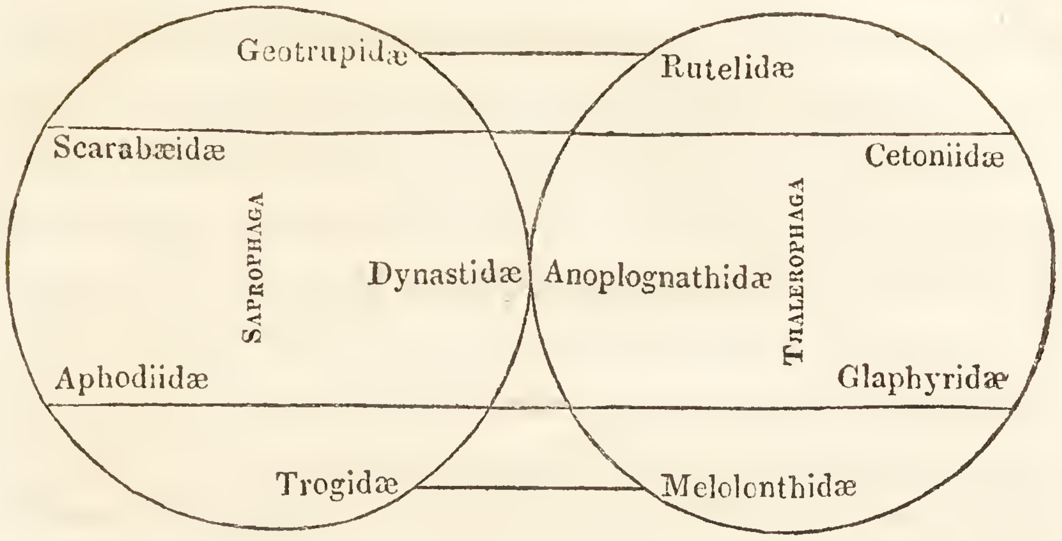
which shall not lead to an artificial distribution. For were the young entomologist to insist upon every one of the four characters in the definition being distinct, he would necessarily exclude from the group many *Histeres* because not herbivorous, the genus *Trachyscelis* because not pentamerous, the genus *Platycerus* because the antennæ are scarcely clavate, and many of the genus *Trox* because the anterior tibiæ are not always externally spinose. It may however be safely asserted, that when any insect does not possess some two of these four characters, it ought not to be considered as belonging to the group.

of affinity carried even still further, as in the genera *Dasygnathus* and *Amblyterus*, of which descriptions will be found in the Appendix. But it is in the construction of the mouth that the most remarkable analogy betrays itself, and consequently is in some degree evident in the manner of living, so that each saprophagous insect may be said to have a thalerophagous one corresponding to it.

Such analogies, nevertheless, must be gathered from the most general view that can be taken of the different groups, and even then are often obscured by real or apparent exceptions. So that, however interesting to the philosopher, they serve but to show that in the creation a general plan was pursued, the infinite shades of deviation from which, in the execution of the details, must render its complete developement by our limited faculties almost hopeless. But to return:—It will next be perceived that each of the columns into which the *Petalocera* are divided, forms a circle; for on the one side we find the *Geotrupidæ* connected with the *Dynastidæ* by means of the genera *Orphnus*, MacL., and *Oryctes*, Lat.; and on the other, the *Rutelidæ* with the *Anoplognathidæ* by means of *Pelidnota* and *Areoda*, both new genera, now for the first time published.—Again: these two circles will be found in a manner to touch one another at the families of *Dynastidæ* and *Anoplognathidæ*, which are, as before stated, intimately connected with each other by such genera as *Dasygnathus* and *Amblyterus*.

The following figure, therefore, which represents two circles, touching one another and composed each of five analogous ganglions, will express well the natural position of the *Petalocera* among themselves.



Such an arrangement is important, were it only that by its means we find connected in the most satisfactory manner the *Rutelidæ* with the *Cetoniidæ*, the *Geotrupidæ* with the *Dynastidæ*, the *Dynastidæ* with the *Anoplognathidæ*, the *Trogidæ* with the *Aphodiidæ*, the *Dynastidæ* with the *Rectacera*,—all which are separated according to the common systems, although their affinity must be obvious to the most careless observer.

An attentive observation of the two circles has led me also to suspect that each of them is divisible into two others, or, which is the same thing, that the insects composing the extremity of each column approach in their general construction to those which form the middle of the same column. Thus the genus *Hybosorus*, MacL., in the family of *Geotrupidæ*, resembles *Ægialia* and *Orphnus*[a], while the African genus *Popillia*, Leach MSS.,(*Melolontha bipunctata*, Oliv.,) and the well known Chinese insect *Melolontha viridis*, Fab., which forms the new genus *Euchlora*, evidently connect the *Rutelidæ* with the *Melolonthidæ*. The inferences that might be deduced from such a disposition, were it perfectly established, are highly interesting; but the present perhaps is not the moment for enlarging on them.

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[a] These as well as the other affinities mentioned in this chapter will be found demonstrated at length in the Appendix.

CHAPTER V.

REMARKS ON THE LINNÆAN GENERA LUCANUS AND HISTER.

THERE are some truths curious and even interesting, which are nevertheless overlooked or despised on the sole account of their having been singly and without comment introduced to our notice. The idea of making use of them as premises from which some inference may be drawn is thus often paralysed; and they accordingly accumulate, until the science which they were intended to illustrate becomes neglected as a barren mass of insulated facts. Such would be the fate of natural history in an especial manner, were we to adopt the vulgar opinion, that it is a science of observation alone. But luckily we know from experience the very reverse to be the case, and that any branch of knowledge, where the true value of a remark can never be perceived until it be connected with others so as to form a regular whole, must therefore depend as much on the employment of our reasoning faculties as on that of the eyes. De Geer, in describing the parts of the mouth in *Geotrupes stercorarius*, Lat., made known an anatomical structure quite as complicated, or even more so than the analogous parts in vertebrated animals, although formed on a totally distinct plan: yet at the time he only added one solitary unconnected fact to the stock then in the possession of entomologists. But the value of De Geer's observations is now established, since Fabricius and his followers have proved that the nature and manners of the insect bear an immediate relation to the form and texture of its organs of manducation. In the same way there will be found in this chapter several remarks on the *Rectocera*, which, though by no means new, will nevertheless be shown to deserve greater attention than they have hitherto obtained.

It may in general be observed of the *Rectocera*, or *Insecta herbivora, pentamera, antennis quasi fractis*, that Nature seems to have dispersed them over the globe much more sparingly than the *Petalocera;* the truth of which will appear from the inspection of any extensive entomological collection. They will however be found to branch off like the *Petalocera* into two columns, the one of saprophagous insects, composing Linnæus's genus *Hister*, and the other of thalerophagous insects, being the same with his *Lucanus:* and it is worth the noticing, that as both circles of the *Petalocera* seem to contain about the same number of species, so there is something like equality perceptible in the contents of the columns of Saprophagous and Thalerophagous *Rectocera*.

As the *Rectocera* are few in number, and these few are but imperfectly known, it can hardly be a matter of surprise that we should not here perceive the infinite gradations of construction which render the *filiation* of Nature among the *Petalocera* comparatively easy to be seized.—A considerable hiatus accordingly often occurs among the *Rectocera*: but that there is no reason to conclude that insects do not exist to fill up such chasms, I shall prove by the description (in the Appendix) of some new insects belonging to the column of Thalerophagous *Recticera*. We shall see there two new genera, which I propose to name *Nigidius* and *Figulus,* intervening between the types of the *Lucanidæ* and *Passalidæ,* possessing the antennæ of the former and the general appearance of the latter, with a construction of the mouth which bears evident analogies to that of both. A family which I have called *Syndesidæ* is clearly connected with the *Passalidæ* by the antennæ and impressed thorax; while their convex form of body, indistinct maxillæ, and short mentum, seem to prove their affinity with *Æsalus,* F. The antennæ also of this last genus, which I suspect however to be not quite in the circle, approach to those of *Lamprima,* Lat., which again joins the *Lucanidæ,* and thus completes the circles by means of two new genera, to which I have given the appellations of *Ryssonotus* and *Pholidotus.*

I have not been able to discern much lateral affinity between the corresponding families of Saprophagous *Petalocera* and Thalerophagous *Recticera,* except at the extremities of the columns, or, which is the same, at the points at which the circles touch one another. In the construction of the mouth, the *Æsalidæ, Syndesidæ,* and *Passalidæ* bear no resemblance to the *Scarabæidæ, Aphodiidæ,* and *Trogidæ.* Indeed, in proportion as the general plan of construction differs, it is clear that we ought not to expect much affinity in the details. Thus a very conspicuous analogy may and does exist between the two columns of *Petalocera,* and even between the two columns of *Recticera,* which by no means can be expected to be so distinct between a Recticerous and a Petalocerous column.

Nevertheless it appears to be a law of Nature never to arrive suddenly at a complete change of form; for we find the *Æsalidæ* resembling the genus *Trox*, F. in general appearance, while the *Syndesidæ* may be called the *Aphodii* of the Thalerophagous *Recticera;* and the *Passalidæ* from their colour and depressed body are, as it were, the *Scarabæidæ* of the same tribe.

With respect to the extreme families of the column, as it is here that the passage from one circle to the other takes place, we find the organs of manducation and the manner of living in each to be most beautifully connected by the genera *Sinodendron*, Lat., and *Lethrus*, Lat. The former of these remarkable insects was placed by Fabricius with some *Bostrichidæ*[a], as well on account of the antennæ as from other causes; and Latreille boasts of having avoided such arrangement, and made it an *Oryctes*, by paying attention to the number of the tarsi[b]. But it is doubtful whether the separation on the last account be not even more artificial than the junction on the first; for these various alterations are rather proofs that our systems are artificial, than that the place last assigned to such anomalous insects ought always to be considered the best. The fact is that *Sinodendron* has evidently some sort of affinity to the *Bostrichidæ*, which would be well worth the trouble of investigation; while nothing also can be more just than the observation of Latreille, "*que le sinodendron est un oryctès avec des antennes de lucane*[c]." This learned and acute entomologist has not however, as might have been expected, made use of this genus to connect his families of *Lucanides* and *Scarabæides*. It is true, indeed, that in his last works he places the *Sinodendron* with the *Lucanides;* but in the third volume of the *Regne Animale,* and more especially under the article *Lamellicornes* in the *Dictionnaire d'Histoire Naturelle,* he appears to think that the *Cetoniidæ* come the nearest to the *Lucanidæ* of all the *Petalocera.* "*Dans quelques espèces les mandibules des males sont beaucoup plus grandes que celles de femelles; c'est ce qu'on observe dans les Lucanes et dans plusieurs Cetoines exotiques; d'autres males de ce dernier genre ainsi que ceux de* Goliath *ont l'extremité anterieure du chaperon divisée en deux parties representant quelquesfois des cornes. De ces rapports et de quelques autres j'en ai conclu que les Cetoines et les Trichies etoient de tous les Scarabées de Linnæus, ceux qui se rapprochoient le plus de ses Lucanes.*" But though the genus *Cetonia* does indeed always with this author immediately precede *Lucanus,* I cannot but think that, after having so acutely pointed out the affinity which *Sinodendron* bears to both *Oryctes* and *Lucanus,* he must have given the above reasons for uniting this last to *Cetonia,* more from an experience of the difficulty of placing them otherwise, according to our modern systems, than on any very evident grounds of affinity. If I may be allowed to differ in opinion with an entomologist of such celebrity, and to whom the science is so much indebted, I should say that the *Cetoniidæ* are of all the *Petalocera* the most unlike to the *Recticera,* and that their membranaceous mandibles can never be assimilated to the immense corneous mandibles of the *Lucanidæ.* On the other hand, I hope to prove that no insects in either column of the *Petalocera* resemble the *Recticera* so much, in general form and construction of the mouth, as the *Geotrupidæ* and *Dynastidæ.* And with respect to the junction of the *Cetoniidæ* to the *Lucanidæ*, on account of the bifid clypeus of the *Goliathi* bearing a resemblance to the gigantic mandibles of *Lucanus*, one can only express astonishment that Latreille should be able to reconcile himself, by such very fanciful reasoning, to an arrangement so evidently unnatural. Both *Cetonia* and *Lucanus* are without doubt insects which live on vegetable juices; but then the maxilla of the former is a thin membranaceous plate proper for the expression of the nectar of flowers, whereas the maxilla of *Lucanus* is a long delicate brush of quite a different form, though extremely well contrived for its object—to lick up the sap flowing from the wounds of trees[a].

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[a] *Syst. Eleuth.* vol. ii. p. 376.

[b] *Hist. Nat. des Crust. et des Ins.* vol. x. p. 15.

[c] *Ibid.* p. 156.

Let us now examine the genus *Lethrus*, which appears to have opposed as many difficulties to entomologists as *Sinodendron*:—it will be interesting to see this hitherto anomalous insect occupying the important place of a link between the *Petalocera* and *Recticera*. Scopoli first instituted the genus[b]; and Fabricius added a new species[c], from its possessing the convex form of body, infundibuliform clava to the antennæ, porrect mandibles, and setose maxillæ, which so strongly characterized the type. As however this new insect was supposed to want the labrum, and its maxillæ also were penicilliform, Schreibers asserted it to be a *Lucanus*[d]. Fabricius had previously hinted that it might prove a new genus, and Latreille accordingly placed it under the name *Lamprima* among his *Lucanides*. Now it is evident that these three great naturalists were all so far right, and only wrong in that Fabricius was not able to connect it with *Lucanus*, nor Schreibers and Latreille with *Lethrus.* Latreille indeed takes notice of an "*organization particulière*[a]" in *Lethrus,* which separates it from *Geotrupes,* but does not remark that this same peculiarity of construction unites it to *Lamprima,* though probably on this very ground Professor Pallas[b] and others had already made it a *Lucanus.* I shall not, however, depend solely on the opinions of systematic writers to prove the connexion between *Lethrus* and *Lamprima,* but resort to observations already recorded. The following characters are extracted from Latreille's *Genera Crustaceorum et Insectorum,* and are common to both genera.

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[a] *Hist. Nat. des Crust. et des Ins.* vol. x. p. 243.

[b] Scop. *Intr. Hist. Nat.* p. 439.

[c] *Syst. Eleuth.* vol. i. p. 2.

[d] *Trans. Linn. Soc.* vol. vi. p. 185.

1. *Antennæ articulis ultimis clavam infundibuliformem formantibus, articulo basilari elongato, conico.* This character belongs to *Geotrupes.*
2. *Mandibulæ validissimæ corneæ porrectæ.* This character is common to *Geotrupes* and *Lucanus.*
3. *Maxillæ in Lamprimâ filiformes setosæ. Maxillæ, in Lethris processu terminali pilis spinulisque corneis, elongatis ciliato.*

It will I hope be allowed that nothing can more satisfactorily show the affinity existing between the *Lucanidæ* and *Lethrus,* than this last remarkable analogy in the construction of the maxillæ. I shall therefore now consider it as in a manner proved, that we are to pass from the *Dynastidæ* to the *Lucanidæ* by means of *Sinodendron,* and from the *Geotrupidæ* to the *Lamprimidæ* by means of *Lethrus.* I have but one more remark to make on the Thalerophagous *Recticera*; which is, that the consideration of their affinity to the *Petalocera* leads us to examine the nature of the genera that form the links of connexion. These genera I propose to call *osculantia*, from their occurring as it were at the point where the circles touch one another, and to distinguish them from *genera annectentia*, or those serving to unite the family in their own circle. These *genera osculantia*,—such as *Sinodendron, Lethrus, Platycerus*, and as I suspect, also *Æsalus*, have in preference to all others a special right to be termed natural, and appear in general to possess a remarkable character, which is the fewness of species of which they are composed[a]. I have mentioned the genus *Platycerus* as one of these, because it will be easily perceived that its form enters with difficulty into the circle of Thalerophagous *Recticera*, and is indeed, as Gyllenhall well observes[b], the connecting link with the *Trogositæ*, to which it approaches in colour, general form, and antennæ, though these last are mostly heteromerous insects, without teeth on the anterior tibiæ. However, as it is not at present my object to discover where this path might lead me, I proceed to the consideration of the Saprophagous *Recticera*.

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[a] *Hist. Nat. des Crust. et des Ins.* vol. x. p. 139.

[b] "Lucanus apterus.—Insectum anomalum inter *Lucanos* et *Scarabæos* coprideos ambiguum." *Icones Insect.* Pallas. 1.—*Nov. Com. Petrop.* Laxman tom. xiv. p. 594.

There are few entomologists who have not been struck with the general resemblance in manners and appearance between these and the Saprophagous *Petalocera;* but no one has attempted to define in what the analogy between them consisted. Soon after Linnæus had instituted the genus, and placed *Hister* immediately after *Scarabæus*, Scopoli said

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[a] It ought to be observed that this peculiarity is not so remarkable in the genera which connect the two circles of *Petalocera* with each other, and therefore it may perhaps belong solely to those singular insects which serve to connect the more discordant groups.

[b] Gyllen. *Ins. Suec.* vol. i. p. 73.

"*neglectis antennis* Histerem *a Scarabæo nemo distinguet*[a]." Degeer, whose entomological sagacity one can never sufficiently admire, placed *Hister* next to *Lucanus*, and remarks, that it appears to form a link between the *Scarabæi* and *Dermestes*. Latreille makes it a member of his family *Sphæridiota*, and remarks that "*aucun insecte de la division des Byrrhes n'a comme les escarbots ces deux charactères, antennes brisées, mandibules avancées*[b]:" and indeed it is true; for such are the characters of his family of *Lucanides*, to which *Hister* naturally conducts us from the *Byrrhi*. This affinity did not escape the usual accuracy of Gyllenhall, who places his new family *Histeroides* immediately after the *Lucanoides*, and before *Sphæridiota*, with the just observation that "*Familia* 10*ma D*i *Latreille* Necrophagi *nempe comprehendit genera plura nimis discrepantia, quare aptius censui* Histeres *a reliquis separare*[c]."

Not having sufficiently studied the Saprophagous *Recticera*, I shall not attempt to say where or by what osculant genera they are connected with the thalerophagous circle. It may be, that these interesting insects are not yet discovered: but my point will be sufficiently established if I can prove that the *Histeridæ* have a strong affinity to the *Lucanidæ* in general; and if I can show the existence of insects belonging to one circle which want some of its distinctive characters, and thus approach to the other. For this purpose, in the first place, I take the following analogous characters from the description of a profound naturalist, who never seems to have suspected the affinity, and consequently, in using his words[a], I can be in no danger of being charged with an attempt to force Nature, as it were, to submit to what may hereafter be termed a theory of entomology.

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[a] *Ent. Carn.* p. 13.

[b] *Hist. Nat. des Crust. et des Ins.* vol. ix. p. 191.

[c] Gyllen. *Ins. Suec.* vol. i. p. 74.

1. *Histeris* "Antennæ thorace breviores, ad basin mandibularum insertæ; fractæ. Articulo basilari maximo, conico, ad extima crassiori, incurvo; octavo clavæ 3-articulatæ basin efficiente."	1. *Lucanidarum* "Antennæ thorace non longiores, fractæ; Capitulo e quinque, quatuor aut tribus lamellis composito." *Lucani* "Antennæ articulo primo longissimo, incurvo, ad apicem sæpius crassiore."
2. *Histeris* "Labrum exsertum, crustaceum, transverso quadratum."	2. *Passali* "Labrum crustaceum, transverso-quadratum, penitus exsertum."
3. *Histeris* "Mandibulæ corneæ, validæ, crassæ, processu interno bidentato."	3. *Lucanidarum* "Mandibulæ corneæ, validissimæ, porrectæ, dentatæ."
4. *Histeris* "Palpi filiformes, articulo ultimo longiore, subcylindrico, obtuso; maxillares paulo longiores."	4. *Lucanidarum* "Palpi filiformes, articulo ultimo subovali aut subcylindrico; maxillares longiores."
5. *Histeris* "Maxillæ laciinis duabus inæqualibus, marginibus internis fimbriato-hirsutissimis; externâ majore, subovato-trigonâ, laciniâ internâ ungue minuto, corneo, bifido, aut duplici genere constructo."	5. *Passali* "Maxillæ processibus corneis, spinosis, internè dentatis; apicali validiore, subtrigono, interno dentibus duobus aut unico."
6. *Histeris* "Mentum quadratum marginis superi medio emarginato."	6. *Passali* "Labium quadratum, mento profunde emarginato."

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[a] *Gen. Crust. et Ins.* vol. ii. p. 46, 130, 131, 136.

It seems superfluous to add any thing to these characters in order to prove the near relation which *Hister* bears to *Lucanus:* but notwithstanding these, and the dentated anterior tarsi, Latreille, in the third volume of the *Regne Animale,* places his tribe *Histerides* between *Silpha,* L. and *Clerus,* L. I am not aware of his reasons for this arrangement; but if it be on account of any resemblance of the larvæ, I should fear that there is an error somewhere. That he is right in asserting in the *Dictionnaire d'Histoire Naturelle,* Art. '*Escarbot,*' that *Hister* can neither be comprised with his Lamellicorn insects nor with his *Sphæridiota,* no one can doubt; but it is surely as clear that it bears a greater affinity to both of these than either to a *Clerus* or a *Silpha.*

In the next place it seems possible that an osculant genus will occur somewhere about the place of *Dorcas:* for *Hister maximus,* L. an insect from Senegal, approaches in some degree to the form of *Lucanus alces,* and is remarkable for having its head as exsert as any of the Thalerophagous *Recticera.* But these difficulties will, I trust, soon be cleared away by my learned friends the Baron Dejean and Dr. Leach, who have both been of late occupied with the examination of the Linnæan *Histeres.* Not having myself studied them in detail, I have adopted the principal groups of the last-mentioned entomologist, given in the *Zoological Miscellany,* and which appear *prima facie* to be very natural. The chasm which occurs, and prevents the completion of the circle, is left to be filled up at some future period, by insects which are to represent the *Lamprimidæ* among the Saprophagous *Recticera.*

To conclude then this long digression,—which I hope, however, will not be found foreign to my original purpose of investigating the nature of the Linnæan *Scarabæi*,—it must be confessed that, excepting the situation of *Hister*, which for the reasons assigned can no longer be held doubtful, every thing with respect to our farther knowledge of the Saprophagous *Recticera* remains yet to be done.

CHAPTER VI.

GENERAL REMARKS ON THE GEOGRAPHICAL DISTRIBUTION OF THE PETALOCERA.

The geography of natural history is as yet but an infant branch of the science, which may be said to owe the principal nurture it has received, as well as its birth, to the labours of the enlightened Humboldt. It had, it is true, been already observed by Buffon, that the animals of the new world are different from those of the old; and various travellers had shown that the productions of different countries bear a character peculiar to each. But these were all rude and fortuitous observations, which had no view whatever to general consequences, or to the developement of those laws by which it is now certain that the geographical distribution of organized matter was regulated at the creation. M. Humboldt and our celebrated countryman Mr. Brown have both contributed greatly towards the discovery of these laws, so far as they relate to the vegetable kingdom; but the geography of animals is as yet enveloped in some degree of obscurity; and in entomology above all, nothing has yet appeared to dispel these clouds, excepting the excellent *Mémoire* of M. Latreille, which is published in the *Annales du Muséum*. But this paper, proof as it undoubtedly must ever remain of the profound learning and inimitable tact for observation of its author, is still rather a collection of facts than an arrangement and application of such facts to the discovery of the general limits by which the dispersion of insects over the earth is restricted. This imperfection, if it be one, is however to be attributed solely to the almost insuperable obstacles which impeded his researches.

Insects are, it need hardly be said, a despised set of beings; though, were we not accustomed to judge of them by their individual size, and were we to look at their numbers and effects, they would assuredly be found among the most powerful agents which nature employs in maintaining the equilibrium of the animal kingdom. The joint consequence, however, of the neglect which they have suffered and of their numberless swarms is, that, compared with the whole number of species, we are acquainted with but few. Well then may Latreille say that the imperfect state of our catalogues has prevented him from pursuing any other plan than that which he has adopted.

Having, however, had the good fortune to inspect almost every collection of note in Europe, excepting those of Vienna and Berlin, I conceive myself in possession of data sufficient to justify an attempt to combat the difficulty under which M. Latreille laboured, and to offer to entomologists the following rough estimate of the various geographical proportions in which the families of *Petalocera* occur. It would, nevertheless, be highly improper not to acknowledge that such calculations, after all, are but vague approximations to the truth, which have nothing to support their accuracy, but inferences drawn from the inspection of many and extensive entomological collections. As such then I give them.

The leading principles upon which organized beings appear to have been dispersed over the globe, are few and simple. The presence of caloric, to whatever cause this may be owing, is undoubtedly the chief excitement of energy in the vital principle; which fact is demonstrated not only by the myriads of organized beings which swarm within the tropics, but also by the ingenious observations of Humboldt and Latreille. These gentlemen have both shown that the highest mountains in the warmest climes exhibit, as we ascend towards their summits, all the various gradations of organized matter which each hemisphere of the whole globe presents as we proceed from the equator to the pole. Still it must not be imagined that a horizontal circle traced round the mountain, or the parallel of latitude which encircles the hemisphere, are necessarily either of them accurate isothermal lines. Experience indeed teaches us the contrary, and fully confirms those inferences we should have drawn from the consideration of the different meteorological effects likely to arise from the variation of the surface of the soil, and other similar causes. Vegetation, for instance, which requires the absence of extreme cold rather than the presence of extreme heat, is likely to extend itself in its tropical form towards the poles farther on a dry continent than on a marshy or low one. Tropical plants will therefore thrive better in Thibet and other inland parts of Northern Asia than they would do were we to transport them to places of the same latitude in America. In this last country the extremes of heat and cold are too widely asunder, and accordingly the vegetation of Canada by no means corresponds either in its general character or number of species with that of places in France under the same latitude.

Animals also are subject to the same sort of limitation with plants: that is, they have to fear extreme cold rather than extreme heat[a]. Such animals therefore as can avoid this cold—either by passing it in a state of torpidity, or by the habit of burrowing in the earth, or by living in the sea, or by artificial clothing,—will in general be found the most widely dispersed, and the least to affect local situations. And insects which can escape the extremes of cold, not only by passing them in the torpid state of *pupa,* but by being generally, when in this torpid state, buried in the earth, must in a special manner be little sensible to the cold winters of northern climates. What they chiefly require is the presence of heat during some period of their existence; and the greater, within certain limits, is the heat, the more active will be their vital principle. On the American continent the extremes of heat and cold in the course of the year are, as is well known, incomparably greater than in places of the same latitude in Europe. We may therefore readily conceive how particular families of insects will inhabit a wider range of latitude in the former country than in the latter. We see also how insects may swarm in the very coldest climates, such as Lapland and Spitzbergen, where the short summer can boast of extraordinary rises in the thermometer, because the energy of the vital principle in such animals is, within certain limits, proportionate to the degree of warmth to which they may be subjected, and escapes in a manner the severe action of cold.

It is on the above principles also that I would account for what may seem at first sight an extraordinary circumstance in the geography of insects; namely, that their tropical structure extends much farther north in America than in Europe; that is, in a manner directly the reverse of that which we have seen to be followed by plants. Examine *Copris carnifex*, F., *Cetonia nitida*, F., *Rutela 6-punctata*, Lat., and other New York insects, and compare them with insects of the same families from Brazil. The difference between the general structure of these will be found infinitely less than that which would result from a comparison of the entomological productions of the neighbourhood of Madrid with those of the banks of the Congo.

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[a] The white bear of Greenland, *Ursus maritimus,* L., appears to dislike warmer climates, from the great obstacles he encounters towards the enjoyment of his favourite element, and the procurement of his food in countries where he cannot float about on the ice. This animal hates drought rather than heat.

Nevertheless, though I contend that the insect tribes suffer less in cold climates than plants, and hope to have proved it to be the case, it does not therefore follow that the prevalence of cold has no effect towards the destruction of insect life. We know the very reverse of this to be the truth, and that the diminution of the number of species becomes very conspicuous as we advance towards the poles. But this I imagine is owing to the short continuance of warmth rather than to the low degree of it while it exists[a]. And accordingly we find that insects, such as gnats, musquitoes, &c., which pass their larva state in water, thus avoiding extreme cold, and whose existence in their perfect state being naturally ephemeral, must therefore suffer little from the shortness of the summer,—are no where more troublesome than in the very coldest climates. Whereas the number of coleopterous insects, which, being naturally longer lived, require a longer continuance of warmth, is sensibly diminished in these dreary countries.

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[a] Heat, properly speaking, never absolutely ceases to exist; but it is here for convenience understood as commencing at 32° of Fahrenheit.

The *Petalocera*, however, occupy so important a place in the œconomy of nature, that we may easily perceive it to be impossible to assert in what latitude they altogether cease to exist. But though it may not thus be easy to prescribe limits of latitude to any of the Petalocerous families, it is otherwise with respect to the longitude; for we find that the *Glaphyridæ* have never as yet been found but in the old world, nor the *Rutelidæ* but in the new. As to the remaining eight families, they appear to have been confined within no limits of longitude, nor indeed of habitable latitude, though we shall see that some families are more plentiful in particular climates than others. Thus the *Aphodiidæ* seem to be most numerous in rather high latitudes, the *Geotrupidæ* in temperate climates, and the *Scarabæidæ* in tropical. The *Trogidæ* and *Melolonthidæ* appear to be scattered rather equably over the globe, which may in some degree arise from their partiality to a particular soil. The *Dynastidæ*, *Cetoniidæ*, *Anoplognathidæ* and *Rutelidæ*, though found in the temperate zones, are all most numerous in the warmer climates; but the two first families recede much farther from the equator than the two last. The *Glaphyridæ*, however, of all the Petalocerous families appear to be the most confined in their range of climate.

In some cases also the geography of the *Petalocera* is affected by local circumstances; for the *Dynastidæ* which are common in America and on the European Continent, have never yet been discovered in England, although the *Oryctes nasicornis* inhabits even the high latitudes of Sweden. If however the truth of the preceding remarks be allowed, such incidents are readily accounted for, since a Petalocerous insect of a tropical family may readily be expected to avoid an English cold summer rather than a Swedish cold winter.

In other cases the distribution of the *Petalocera* appears to have been regulated by a higher purpose. Thus, if my observations on the subject have not deceived me, the species of coprophagous insects from within the tropics are to those from without, nearly in the proportion of 4:3; which, if we reflect on the services rendered in hot climates by these scavengers of nature, appears to be a limitation that is in some measure required by necessity. A similar purpose of utility may account for the species of coprophagous insects, that is, those composing the three families *Geotrupidæ*, *Scarabæidæ*, and *Aphodiidæ*, being to the number of species which compose the remainder of the Saprophagous Petalocera in the proportion of about 3:2.—Ignorant as we are of the habits of the *Rutelidæ* and *Anoplognathidæ*, it is impossible at present to carry the same kind of investigation among the thalerophagous insects; though it may excite some little curiosity to know what proportion the species of phyllophagous *Petalocera* bear to those which feed on flowers. If it be allowable to argue from the general œconomy of nature, it would seem that the number of the former ought to be predominant, and this I suspect to be really the case.

But this highly amusing subject must be left to some future period, when the continued prosecution of discoveries by intelligent travellers shall have supplied entomologists with that information from which alone such calculations must always be derived.

FAMILIARUM SYNOPSIS.

- PETALOCERA.
  - SAPROPHAGA.
    - Maxillæ processubusmembranaceis. Insecta succis excrementitiis victitantia.
      - Mandibulæ porrectæ corneæ.
        - 1. Geotrupidæ. Sub stercore vel boletis putridis terram fodientes.
      - Mandibulæ sub clypeo latitantes membranaceæ.
        - Palpi maxime hirti, labiales articulo terminali abrupte minore. *Coleoptra non longiora quam latiora.*
          - 2. Scarabæidæ. Stercoricolæ in crepusculo volitantes.
        - Palpi glabri articulis subæqualibus cylindricis. *Coleoptra longiora quam latiora.*
          - 3. Aphodiidæ. Stercoricolæ in sole volitantes.
    - Maxillæ corneæ.
      - Maxillæ processubus duobus, interno dente arcuato corneo sæpius instructo. Labrum distinctum subquadratum. *Ano obvoluto.*
        - 4. Trogidæ. Sabulicolæ materiis putrescentibus victitantes.
      - Maxillæ dentatæ vel inermes, sed processu unico et sine unco arcuato. Labrum clypeo occultum. *Ano detecto.*
        - 5. Dynastidæ. Xylophagi, in cortice lignove putrido habitantes.
  - THALEROPHAGA.
    - Maxillæ corneæ. Clypeus suturâ transversâ divisus.
      - Maxillæ dentatæ vel inermes. Labrum trigonum.
        - 6. Anoplognathidæ. Phyllophagi? sed mores reverâ adhuc incogniti.
      - Maxillæ dentatæ. Labrum lineare vel sæpius emarginatum.
        - 7. Melolonthidæ. Sabulicolæ materiis vigescentibus victitantes.
    - Maxillæ processubusmembranaceis. Insecta florum vel arborum succis victitantia.
      - Mandibulæ sub clypeo latitantes.
        - Mandibulæ corneæ. Labrum exsertum.
          - 8. Glaphyridæ. Anthobii, sed mandibulis corneis florum forsan petala destruentes.
        - Mandibulæ membranaceæ. Labrum clypeo obtectum.
          - 9. Cetoniidæ. Anthobii, sed mandibuli smembranaceis florum vel arborum succos bibentes.
      - Mandibulæ porrectæ corneæ.
        - 10. Rutelidæ. Mores adhuc incogniti.

CHAPTER VII.

ON THE FIVE FAMILIES OF PETALOCERA WHICH LIVE ON PUTRID OR DECOMPOSED VEGETABLE MATTER.

SINCE from the circumstance that has been mentioned of their disposition in circles, it becomes very troublesome to arrange the *Petalocera* in a cabinet according to their natural affinities, the series prefixed to this chapter may be adopted for the purpose ; and it is perfectly natural, provided the connexion of the extreme families *Geotrupidæ* and *Rutelidæ* with the centre families *Dynastidæ* and *Anoplognathidæ*, be always borne in mind. The characters given to the ten families in this table may, however, be thought too brief for the inexperienced entomologist : and it is true indeed, that they only express the forms of construction to one or other of which every Petalocerous insect tends, and not those at which they all actually arrive. Thus the *Rutelidæ* and *Geotrupidæ* do not all possess a membranaceous process to their maxillæ ; but the genera *Chasmodia* and *Geotrupes*, which perhaps are the types of the families, possess such. I have therefore imagined that it might be of some little service to attempt the still more detailed definitions of each family which follow ; though to me it appears that any advantage which may thus be gained, will be at the expense of some natural affinity. And for this opinion I have no less authority than that of Linnæus, who could never be persuaded to define his natural orders in botany, from a conviction that the investigation of nature by means of preconceived rules and definitions, is an attempt as absurd as it would be to investigate truth by means of a set of prejudices. He felt that the student in the more profound branches of the science ought to have already paved the way for this sort of research, by that intimate and extensive knowledge of species which can always be most easily acquired by artificial methods. We see, therefore, that naturalists must always owe a large portion of gratitude to those who may by the help of artificial systems have made the productions of nature generally known: for it is with the materials collected by the humble labours of these indefatigable men, that the world can alone expect that the foundations of our knowledge with respect to nature should ever be laid.

Fam. I. GEOTRUPIDÆ.

Antennæ *decem vel undecim articulatæ;*
Articulo basilari subconico, vix elongato;
Capitulo magno, triphyllo, subgloboso.

Labrum *exsertum, crustaceum, transversum, subquadratum; margine antico ciliato.*

Mandibulæ *exsertæ, corneæ, validissimæ, subtrigonæ, depressæ, ad apicem subarcuatæ.*

Maxillæ *crustaceæ; margine interno vel apicali membranaceo aut fimbriato hirsuto.*

Palpi *maxillares filiformes.*

Labium *bipartitum,* mento *bifido vel integro.*

Caput *lateribus utrinque ante oculos auriculatim sæpius dilatatis;* Clypeo *parvo, angulato, depresso.* Corpus *orbiculato-ovale aut suborbiculare, undique convexum.* Thorax *latius quam longius extensus; Scutello* *sæpius distincto.* Pedes *validi, tibiis anticis dentatis, spinis apicalibus instructis; tibiis quatuor posticis apice sæpius dilatatis.*

OBSERVATIONS.

The characters hitherto given by entomologists to this family, which is altogether the same as the *Geotrupini* of Latreille, have been founded on the scrutiny of a few well known European insects. To use such definitions therefore strictly would be equivalent to the exclusion of many true *Geotrupidæ* from their natural place. Concisely describing these insects, it may be said that they differ from the *Scarabæidæ* by their corneous mandibles, and from the *Dynastidæ* by their exserted labrum. But such characters, like all others, are subject to an infinity of shades, and may even altogether disappear in some insects of this family, hereafter to be discovered. In such anomalous cases however, it will, I think, be always found that the insects belong to extreme genera, or to those which are close on the limits of other families.

The *Geotrupidæ* are coprophagous or boletophagous. Some extreme genera of the family, however, feed on roots, and may often be considered as even lignivorous. The types or central insects of the family, which are the best known, excavate cylindrical holes in the earth under their food, and thus approach in their manners as well as form to some of the *Scarabæidæ*.

From the *Geotrupidæ* which I have had opportunities of seeing, it may be calculated that the proportions of those from within the tropics, from the temperate zones, and from latitudes higher than 60°, are to one another nearly as 2, 10, and 1. And by way of proof that the *Gëotrupidæ* are principally confined to temperate climates, I may observe that the tropical insects of this family principally belong to the extreme genera, such as *Athyreus*, and *Hybosorus*, the former of which approaches to the *Scarabæidæ* and the latter to the *Dynastidæ*.

Fam. II. SCARABÆIDÆ.

Antennæ 9- *vel* 8-*articulatæ capite paulo longiores;*
Articulo primo elongato, aliorum conjunctim longitudine, cylindrico, ad apicem basinque paulo crassiore; secundo brevi subconico vel subgloboso.
Clavâ magnâ triphyllâ.

Labrum *clypeo occultatum, membranaceum, in medio carinatum, antice ciliatum.*

Mandibulæ *sub clypeo latitantes, basi corneæ, deinde in laminam productæ elongatam, lanceolatam, compressam, membranaceam, latere interno et apice fimbriatis.*

Maxillæ *crustaceæ, laciniis duabus instructæ; apicali transversâ, subrotundatâ, fungosâ, membranaceâ, fimbriatâ, lobo interno homogeneo, subtrigono, pariterque fimbriato, apice subacuto.*

Palpi maxillares *filiformes, labialibus vix duplo longiores;*
Articulo ultimo ad basin et apicem graciliore.

Palpi labiales *maxime hirti, articulis subdilatatis;*
Articulo tertio aut terminali parvo, aliis abruptè minore, in nonnullis obsoleto.

Labium *membranaceum, mento occultatum, apice bifidum, laciniis pone palpos et eorundem usque ad* *articulum secundum productis, paululùm extus arcuatis, fimbriatis.*

Mentum *crustaceum, subquadratum, profundè emarginatum.*

Caput *subsemicirculare; clypeo sæpe dentato, interdum cornuto.* Corpus *orbiculato-ovale, convexum vel depressum; abdomine brevi, elytris haud obtecto.* Thorax *transversus; scutello rarissime distincto, subtrigono.* Pectus *magnum, ideoque femora intermedia ad basin latè dispartita.* Pedes *validi, unguibus minimis; tibiæ anticæ extrinsecus 3-dentatæ, apice calcare uno instructæ, tarsis exiguis, in quibusdam obsoletis; tibiæ mediæ apice 2-calcaratæ, posticè calcare uno instructæ.*

OBSERVATIONS.

The *Scarabæidæ* occupy a most important place in the economy of nature, and possess so very distinct a form that they are only likely to be confounded with the *Aphodiidæ*; from these, however, they may be distinguished by their elongate lanceolate mandibles and large pectus. Several genera of the *Scarabæidæ*,—such as *Onitis*, *Onthophagus*, &c.—approach so nearly to *Aphodius*, that here, as in most cases where families meet, it will be found most difficult if not impossible to draw the line of demarcation. There is less likelihood of confounding them with the *Geotrupidæ*, because, though several insects in both families evidently approach to one another in general form and structure, yet none that I have yet seen can accurately be said to fill up the interval that occurs between the corneous porrect mandibles of the one family, and those which are membranaceous and concealed under the clypeus in the other. But let this sole distinction be overlooked, and some of the *Geotrupidæ,* such as the genus *Athyreus,* will find a place among the *Scarabæidæ.*

The *Scarabæidæ* are all strictly coprophagous; and this great affinity in their manner of living is in all probability the cause of the organs of manducation being so similar throughout the family, as by no means to supply the distinctive characters that might have been expected from the marked variety of their general forms. Owing to this extraordinary similarity in the *instrumenta cibaria* of the different insects which compose the group, Latreille has more than once proposed to make but one genus of them, ascribing to the modern genera the name of sections. But though I have had reason to know that the father of modern entomology is far from thinking that genera, as commonly understood, exist in nature, it is nevertheless easy to perceive that alterations of the above sort must resolve themselves into the idea of natural genera. For if the animal creation knows any other absolute distinction than that of sex and species, and the groups insulated by these other absolute distinctions are to be termed *genera,* it is clear even to an axiom, that where such natural divisions cease to be apparent, genera can be said no longer to exist. Nothing, however, has yet occurred in the course of my observation but what has demonstrated the truth of the principles upon which the present investigation was commenced. These were, as I have already stated, that any other difference that may exist between animals than those of sex and species, is not absolute, but must be considered as arising solely from the imperfection of our own knowledge of Nature's productions; and that genera consequently become artificial, and only useful as serving to subdivide our more general ideas. In my opinion, therefore, the *Scarabæidæ* compose such a numerous family that for the sake of convenience we not only ought to retain all the established genera, but in several cases even to add a great many more to the present list, requiring only that they shall always be supported by characters visible to the naked eye.

This same difficulty of subdivision is not by any means peculiar to the *Scarabæidæ*, but will be experienced also in the equally numerous family of *Cetoniidæ*, which answers to those insects in the other circle. The *Scarabæidæ* also constitute the only family of the saprophagous circle containing insects having the produced sternum and lobate thorax, which form such remarkable characters in some of the *Cetoniidæ:*—all which circumstances prove, if farther proofs were indeed wanting, that these two families bear to each other a certain analogical relation.

The *Scarabæidæ* afford a curious example of the artificial nature of the sections that may be founded on the disposition of the tarsi. If the *Heteromera* for instance be a natural section, as stated in some of the latest entomological works, a genus such as *Onitis* ought *à fortiori* to compose a like division, since in one at least of the sexes it wants the tarsi of the fore-legs altogether. Yet how obviously would such an arrangement oppose all our notions of natural affinities !

In none of the *Coleoptera* perhaps does the general structure of the feet assume so extraordinary an appearance as with the *Scarabæidæ*. The externally dentated and somewhat curved fore-feet of these, with the tarsi nearly obsolete, can only vie in the anomaly of their form with the hind-legs proceeding from a transverse moveable trochanter, and placed so near the hinder extremity of the body, and so far from each other, as to give the insect in walking the most awkward appearance possible. This peculiar formation is nevertheless particularly serviceable to its possessors, in rolling the balls of excrementitious matter in which they inclose their eggs.

Proceeding upon the data which I have been able to collect, it may be said that the tropical *Scarabæidæ* are to those from without the tropics nearly as 5 : 1. Out of 450 species and upwards in my father's collection, only nine are natives of England; and of these nine, no less than eight are *Onthophagi*, which I consider as composing an extreme genus of the family, not the less interesting from having been noticed by Pliny[a].

Fam. III. APHODIIDÆ.

Antennæ *articulis novem, capite paulo longiores;*
Articulo primo elongato, aliorum conjunctim vix longitudine, cylindrico, ad apicem paulo crassiore; secundo hemisphærico;
Capitulo subgloboso-ovato, triphyllo.

Labrum *sub clypeo latitans, membranaceum, margine antico vix ciliato, medio subacuto.*

Mandibulæ *clypeo obtectæ, ad basin corneæ, deinde in laminam brevem, compressam, dilatatam, coriaceam aut vix membranaceam productæ; latere interno et apice haud fimbriatis.*

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[a] "Tauri vocantur Scarabæi terrestres, ricino similes; nomen cornicula dedêre. Alii pediculos terræ vocant." Plin. *Hist. Nat.* lib. xxx. c. 12.

Maxillæ *laciniis duabus subæqualibus; apicali membranaceâ, fungosâ, margine supero extrorsum rotundatâ, interdum minore, processu interno crustaceo, obtuso.*

Palpi maxillares *filiformes, labialibus fere triplo longiores;*

Articulo ultimo aliis longiore, ovali-cylindrico, ad basin paulo graciliore.

Palpi labiales *fere glabri, articulis subglobosis;*

Articulo tertio aut terminali aliis majore, orbiculato-ovali.

Labium *minutum, membranaceum, sub-pilosum; mento occultatum, apice bifidum.*

Mentum *crustaceum, subquadratum, versus apicem angustius, margine antico emarginato.*

Caput *subsemicirculare;* Clypeo *sæpe tuberculato, nunquam dentato.* Corpus *ovatum aut ovale, ad apicem rotundatum, suprà convexiusculum.* Elytra *abdomen superne et ad latera obvolventia.* Thorax *transverso-quadratus;* Scutello *semper distincto.* Pedes *validi, omnes æque dissiti; tibiis anticis tridentatis, intus lineâ impressis pilisque fimbriatis.*

OBSERVATIONS.

The *Aphodiidæ* differ from the *Scarabæidæ* in having short dilated coriaceous mandibles, and the pairs of feet at equal distance from each other. They are also sufficiently separated from the *Trogidæ*, in having their labrum concealed under the clypeus, and by their mandibles being thin, compressed, and scarcely to be called corneous. All the insects known of this family have the scutellum distinct:

they comprise the least of the *Petalocera* ; and though resembling each other excessively in general structure, differ extremely in the manner of living, some being coprophagous, and others living on putrescent vegetable matter generally marine. These last insects consequently lead to that family of *Petalocera* which frequents sandy situations.

Of all the Saprophagous *Petalocera* the *Aphodiidæ* are the most common in England, and seem to replace with us the want of the *Scarabæidæ*. They appear indeed to be equally frequent over the whole of the north temperate zone, and I have made out the proportion of tropical insects of this family to be to those from countries without the tropics as 1 : 8. None have hitherto been brought from New Holland, though we are acquainted with *Aphodiidæ* from the Cape, which is nearly of the same south latitude. The coprophagous insects of New Holland seem indeed to be principally composed of the genus *Onthophagus* or of insects approaching to it, though even these occur but rarely. This rarity of coprophagous insects in New Holland is of course the natural consequence of that great peculiarity of the Australasian continent, namely, the want of all large herbivorous mammalia except of the marsupial kind. Still I have little doubt but that if the marine detritus of the coast of New Holland were properly searched, we should acquire the knowledge of several insects approaching to *Psammodii* in habit.

Fam. IV. TROGIDÆ.

Antennæ *breves, novem vel decem articulis, basilari crasso;*

Capitulo triphyllo, ovato, transverso, lamellarum disco utrinque sæpius convexo.

Labrum *coriaceum, exsertum, sæpius hirsutum.*

Mandibulæ *corneæ, crassæ, validæ, intus arcuatæ, interdum dentatæ, apice acutissimo.*

Maxillæ *laciniis duabus, internâ corneâ unidentatâ vel dentibus instructâ, interdum unco corneo valido processus hujus loco; laciniâ externâ vel membranaceâ et vix fimbriatâ, vel corneâ et ciliis spinuliformibus aut dentibus corneis armatâ.*

Palpi maxillares *maxillis longiores.*

Palpi labiales *articulo ultimo ovato, plerumque crassiore.*

Mentum *irregulare.*

Caput *subquadratum,* Clypeo *brevi, antice convexo.* Corpus *ovatum, plerumque valde gibbum, subtus planum;* Coleoptra *maxima, gibboso-convexa, fornicata, ad latera undique deflexa, ano ipso obvoluto.* Thorax *transversus ; Scutello distincto.* Pedes *formâ variantes ; tibiis anticis sæpe dentibus haud munitis.*

OBSERVATIONS.

The *Trogidæ,* though by no means a family having such strong general characters impressed on it as either of those we have hitherto considered, may nevertheless be distinguished from them all with considerable facility. Their antennæ in the first place have the *lamellæ* of their clava convex on both sides; so that the three joints of which this is composed are always very distinct; whereas in the *Geotrupidæ* the first and second joints of the clava are one or

both infundibuliform, so that the whole becomes to the naked eye united under the form of a globular mass. Again, from the *Scarabæidæ*, *Aphodiidæ*, and *Dynastidæ*, the *Trogidæ* are generally to be distinguished by their exserted labrum. This family of all the Saprophagous *Petalocera* appears to contain the fewest species, and moreover seems to be distributed in nearly equal portions over the tropical and temperate climates. Another peculiarity attending it is, that it contains apterous insects, which are unknown as yet among all the other families of *Petalocera.*

If the observations of the more modern entomologists are altogether to be relied on, the economy also of the *Trogidæ* differs in some cases considerably from that of the other Petalocerous insects. As, however, this is a question by no means decided and rather interesting, I shall enter briefly into the discussion of it.

The genus *Ægialia* is found upon the seashore with the *Psammodii,* to which it bears so remarkable an affinity; and in all probability lives with these insects on putrid seaweed, or other marine detritus. The genus *Acanthocerus,* the type of which appears to be *Trox spinicornis,* Fab., cannot, any more than *Ægialia,* be considered to feed on the dried carcases of animals, as the slight construction of its mandibles and membranaceous maxillæ must render it altogether unfit to live on any but the most soft and pulpy substances. *Trox horridus* of Fabricius, which is distinguished from most others of the original genus by a triangular labrum, and by its body being apterous and elytra connate, I have separated from the rest, under the generic appellation of *Phoberus.* This insect, as I conceive, does not feed on dried cadaverous substances; because it may be observed that all insects intended to live on animal matter partially dispersed and collected in masses, are furnished with wings, in order to convey them the more rapidly to the objects pointed out by their instinct. Thus the genera *Silpha, Hister, Dermestes,* and indeed all other necrophagous insects, are winged; whereas the genera *Pimelia, Brachycerus,* &c., which live like *Phoberus* on sandy deserts, are apterous, a formation which must arise from the particles of which their food is composed being so universally and generally spread over these plains as to render rapid and distant change of place quite unnecessary. It remains therefore only to consider the nature and economy of such of the *Troges* as are provided with wings, of which division are all those hitherto known as European. Olivier says of these, that they are to be met with on the ground in the fields, and in sandy and rather dry places; and that they are sometimes observed on dried animal substances, occupied in gnawing the cartilaginous parts which serve as the last connexion for the bones of carcases from off which the flesh has been long devoured or consumed. Latreille makes nearly the same remark in his *Histoire Générale des Insectes;* and Mr. Kirby mentions in the Introduction to Entomology, his having found these insects on a ram's horn. I was myself present in the forest of Fontainebleau, with the last mentioned entomologist, when he took a specimen of *Trox* from off a horse's scull; but it would have been difficult to have discovered either cartilaginous matter or fleshy substance on these bones, which appeared from their colour to have been long exposed to the action of the atmosphere. Indeed nothing can strictly be said to have been determined with respect to the manners of the *Troges,* except that these insects are attracted to dried bones: but whether this be owing to their whiteness[a], or to the fleshy substance that may still remain attached to them, or to any vegetable matter whose growth may be particularly favoured by the presence of such substances, it would be difficult to say. Pallas even, who observed several of these insects in Siberia, only says that "*sub cadaveribus æstivo ardore exsiccatis cum Histeribus et Dermestibus hospitatur;*" from which expression it must be considered as anticipating an observation, if we conclude with Olivier that the insect *feeds* on such carcases. To these remarks I have only to add another circumstance, which I hope will excite the entomologist to study the economy of these insects, and so decide whether in reality they form an exception to the herbivorous disposition of the rest of the *Petalocera.*—In the *Memoires pour l'Histoire des Insectes,* Degeer says of his *Scarabé à tubercules* (which according to Schönherr is the *Trox luridus* Fab.), that M. Acrelius had found it in rotten wood in Pennsylvania.

Of all the *Petalocera,* the *Trogidæ* appear to approach the nearest in general habit to the Saprophagous *Rectocera,* though they differ most widely in the characters of the mouth. They delight in cadaverous matter like the *Hister.* Like this last insect their head is sunk in the thorax in a very peculiar manner, and moreover both of them have the curious habit when alarmed of counterfeiting death, by applying their feet and antennæ close to the body, and ceasing all motion until their fear may have subsided. There is also a most striking general

[a] There are few entomological collectors not aware of the advantages to be derived from exposing in the sun any thing white, such as linen, &c. for the purpose of attracting the Coleoptera.

similarity of construction in the genus *Acanthocerus* and several of the Saprophagous *Rectocera,* such as *Sphærites glabratus,* (*Hister glabratus* F.) &c. But that character which is as striking in the Saprophagous *Rectocera* as it is in the three other columns forming the subject of this work,—namely, the anterior tibiæ being dentated,—is often in the *Trogidæ* indistinct; so that we have here another proof of the absurdity of restricting nature to any characters which are not obviously and directly founded on the manner of living.

Fam. V. DYNASTIDÆ.

Antennæ *articulis decem, basilari longo, conico, hirsuto; secundo subgloboso; 3° 4° 5° et 6° brevissimis transversis, paulo sensim latioribus; tribus ultimis capitulum triphyllum ovatum sæpius breve formantibus.*

Labrum *membranaceum, clypeo sæpius fere penitus occultatum, ejusque paginæ inferæ adhærens, margine antico rotundato, sericeo pilorum fasciculo sæpius fimbriato.*

Mandibulæ *subtrigonæ, corneæ, basi crassæ, latere externo sæpe eminulo, suprà versus apicem concavæ vel planæ, subtus convexiusculæ.*

Maxillæ *dentatæ vel inermes, caule crustaceo, processu unico, corneo vel coriaceo, hirsuto vel setoso.*

Palpi maxillares *articulo basilari minimo.*

Palpi labiales *menti versus apicem inserti.*

Mentum *pilosum, convexum, elongatum, labium occultans, apice obtuso vel truncato.*

Caput *subtrigonum; clypeo sæpe cornuto.* Corpus *subtus* *sæpius pubescens, coleoptris abdomen postice non obtegentibus.* Thorax *sæpe cornutus, vel mucronatus vel excavatus.* Scutellum *distinctum, triangulare.* Sternum *nunquam productum.* Pedes *validi, tarsorum unguibus indivisis.*

OBSERVATIONS.

This family is remarkable as well for containing some of the most bulky of coleopterous insects, as for the difference which often occurs in the external appearance of the sexes. It may be separated from the *Trogidæ* and *Geotrupidæ* with ease on examining the labrum, which in the *Dynastidæ* is almost always concealed under the clypeus, instead of being distinct as in the other two cases. I have here, as also in the corresponding family of the circle of Thalerophagous *Petalocera*, in some manner disregarded the shape of the maxillæ for the sake of general habit. Latreille in his various works has made a distinct division of the *Dynastidæ* which have their maxillæ unarmed. But the general habits and appearance of the genera *Oryctes* and *Dynastes* being so very similar, and several insects occurring to fill up the chasm between them, I conceived that it would be an artificial interruption of the order of Nature, to place two such insects as *Oryctes nasicornis*, Illig. and *Scarabæus Boas*, Lat. in different families.

The *Dynastidæ* live either in rich vegetable mould or in the putrid detritus which results from the decomposition of trees. Perhaps also some are strictly lignivorous, particularly the large foreign species of *Dynastes*; but the truth is, that the economy of these insects has hitherto been so little studied, that it is almost entirely from analogy that we must decide on their manner of living. Olivier, with whose first family of *Scarabæi* the *Dynastidæ* coincide, says, with great propriety, that "*aucun ne se trouve dans les bouses et les fientes des animaux.*" Yet, in the zoological part of Humboldt's accurate work on South America, this learned author states, that the *Geotrupes Ægeon* of Fabricius is found "*à Chilo près de Quito sur des bouses de vache*[a]." Now, though a circumstance being thus mentioned in so celebrated a work might lead us to suppose that the insect is coprophagous, it may clearly be demonstrated from analogy, and particularly from the dissection of the parts of the mouth, that if such were the situation of *Dynastes Ægeon* when found, it could only be accidental. The texture indeed of the maxillæ, which are always corneous; the construction of the feet, which though strong are by no means dilated; the size of their tarsi and ungues, and their comparatively small pectus, forbid us to suppose that any of the family of *Dynastidæ* can be coprophagous.

There is, however, a curious distinction, to which we have before alluded, existing between certain insects of the family of *Dynastidæ;* namely, the maxillæ being dentated in some species and unprovided with teeth in others. These last are most known to entomologists, from the *Oryctes nasicornis,* which is their best type, being very common in tan-beds and rich vegetable mould on the continent; but more especially from the celebrated Swammerdam having early made this animal with its larva the object of very detailed and accurate anatomical researches.

Degeer mentions that in shifting a dungheap at Stockholm, which had remained so long on the same spot as to have been entirely changed into a rich mould, he one day dug out a prodigious quantity of the larvæ of *Oryctes nasicornis,* accompanied by specimens of the perfect insect. We see therefore that the unarmed maxillæ suit very well with the consistence of the substance which this species has chosen for its food. But do all the *Dynastidæ* live in the same manner? This is a question that in the present state of the science cannot be answered. It is possible that those which are provided with teeth to their maxillæ have to act on harder materials than the rich mould or soft tan on which the *Oryctes* lives. It may be that the genus *Dynastes* is truly lignivorous, or at least feeds on wood and other vegetable matter when in a less decomposed state than seems suitable for the insects with unarmed maxillæ. But these are points yet to be determined; and certainly are more interesting, more worthy of examination, and more likely to advance the cause of the science, than the simple discrimination of species and synonyms.

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[a] *Voyage de Humboldt et Bonpland. Observations de Zoologie et d'Anatomie comparée.* Vol. 1. p. 182.

The *Dynastidæ,* though a numerous family, are by no means equably dispersed over the globe; Europe containing only three or four species, whereas on the other hand the torrid zone is pestered with these insects, formidable however rather from their size than from any noxious qualities. I have calculated the proportion of species from countries within the tropics to be to those from without about 8 : 1. and there is reason to believe that this estimate comes very near the truth.

Some insects of this family approach excessively close to the thalerophagous circle, as will be seen by the anatomical details in the Appendix. In fact, it is no easy matter to distinguish the *Dynastidæ* from some of the *Anoplognathidæ* and *Rutelidæ:* but the best distinctive marks will probably be found in the exserted labrum of the *Anoplognathidæ*, and in the transverse suture of the clypeus and porrect sternum of the *Rutelidæ;* one or other of which characters is always observable in such insects as are most likely to be confounded with the *Dynastidæ*.

On the whole then, the preceding descriptions indicate the existence of a circular group consisting of five families, the colour of which is almost always lurid or black. The insects composing this group have the clava always short and thick, with a number of articulations to the antennæ, which varies from eight to eleven. Their feet are always robust, and the ungues of their tarsi, when they exist, are undivided. Such are the few vague circumstances which, together with the nature of their food (which is invariably in a state of putrescence or decomposition), are almost all the external characters that can be ascribed to the Saprophagous *Petalocera*.

CHAPTER VIII.

ON THE FIVE FAMILIES OF PETALOCERA WHICH FEED ON GREEN OR LIVING VEGETABLE MATTER.

THE Thalerophagous *Petalocera*, as far as has yet been observed, have never more than ten joints or less than nine to their antennæ; so that they possess neither so many or so few as some of the insects which compose the other circle. The clava, which is always rather elongate, except in a few insects of the family of *Glaphyridæ*, is here often composed of more than three joints, which we have never seen to be the case with the saprophagous insects. The feet are also in general less robust than in the last circle, but in the families of *Rutelidæ* and *Anoplognathidæ* they sometimes arrive at an enormous size[a]. The ungues of the tarsi are also often divided; and the insects on the whole are of a gay appearance, generally possessing much metallic splendour.

Fam. VI. RUTELIDÆ.

Antennæ[b] *decem-articulatæ;*

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[a] Such is the case with the famous Kanguroo Beetle (*Scarabæus Macropus*, Francillon; *Cetonia Macropus*, Kirby) and the *Melolontha chrysochlora* of Humboldt, the natural situation of both which insects is between the types of the *Rutelidæ* and *Anoplognathidæ*.

[b] If the genus *Hexodon* should, as is stated by Olivier, really possess

Articulo basilari turbinato, parum elongato, septimo minimo pateriformi ;

Capitulo 3-phyllo elongato.

Labrum *margine antico coriaceo, conspicuo, brevissimo, sæpius emarginato.*

Mandibulæ *corneæ, validæ, subcompressæ, plerumque exsertæ, latere externo eminulo, sæpius crenato aut dentato.*

Maxillæ *corneæ, ad apicem dentatæ, latere interno interdum membranaceo, ciliato.*

Palpi maxillares, *articulo ultimo subcrassiore.*

Palpi labiales *breves.*

Mentum *planum, subovatum, versus apicem paulo coarctatum, apice truncato, sæpius emarginato, ad angulos dilatato.*

Caput *subtrigonum aut subquadratum, nunquam cornutum.* Clypeus *suturâ vix distinctâ, margineque reflexo.* Corpus *subconvexum aut depressum, ovatum; Elytris abdomen postice haud occultantibus.* Thorax *transverso-quadratus ; Scutello semper distincto.* Sternum *antice productum.* Pedes *robusti, femoribus posticis interdum incrassatis ; tarsorum unguibus divisis aut indivisis.*

OBSERVATIONS.

The *Rutelidæ* are, on account of their structure and use in connecting the other families, perhaps the most interesting of the *Petalocera*. How great their affinity is to the

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eleven joints to the antenna, it will form a remarkable exception to the rule followed in the structure of the rest of the family. But as Latreille says that there are only ten joints, I have not thought proper to take any notice of Olivier's opinion in the above general characters of the family.

Dynastidæ has been already shown; and if our attention be transferred to the thalerophagous insects, we shall also experience no trifling difficulty in the attempt to separate them from the *Cetoniidæ* and *Anoplognathidæ*, but especially from the latter. In fact, the principal distinction that I have observed to exist between these families is, that the mandibles of the *Rutelidæ* are generally prominent, whereas those of the *Anoplognathidæ* are concealed beneath the clypeus; the maxillæ of the latter are also more obtuse than those of the former family, which are always sharply dentated at the apex. With respect to the *Cetoniidæ*, their membranaceous mandibles form an obvious and easily seized character of separation. It is indeed not a little curious, that while we observe among the *Rutelidæ* and *Geotrupidæ* that such genera as *Macraspis* and *Athyreus* approach so nearly in habit and general form to the respective families of *Cetoniidæ* and *Scarabæidæ*, there should still be the same parallel distinction kept up in both circles with respect to the texture of their mandibles.

The *Rutelidæ* may be said to have been first indicated by Olivier, who formed his third division of *Cetonia* of such insects as those composing the new genera *Macraspis* and *Chasmodia*. This excellent entomologist remarked that they appear to connect *Cetonia* with *Melolontha*, but in some respects to approach nearer to the last. This hint was considerably improved upon by Latreille, who united with the above insects the *Melolontha 6-punctata*, Fab., and gave to the whole the generic name of *Rutela*. In the *Histoire Générale des Insectes et des Crustacés*, M. Latreille also observes that the *Rutelæ* have the palpi, maxillæ and mentum of *Melolontha*, with the labrum of

Cetonia, and the mandibles of *Dynastes*; but notwithstanding, in his later works he places them at a distance from *Cetonia*; so that, if this order of distribution be natural, these insects would appear to have a greater affinity to *Glaphyrus* than to the *Cetoniidæ*. But it requires only the slightest examination to perceive that the *Rutelidæ* form a point of union for the families of *Melolonthidæ*, *Anoplognathidæ*, and *Cetoniidæ*, and that they come excessively near to the *Dynastidæ* in the true genus *Rutela*, of which the type is *Rutela lineola*, Lat.

The *Rutelidæ* may perhaps vie with the *Cetoniidæ* for beauty, and certainly exceed them in metallic brilliancy. They are peculiar to the new world, with the solitary exception of *Hexodon reticulatum*[a] Oliv.; of which however neither the country nor the natural situation in the system is as yet accurately determined. Out of upwards of eighty species of this family in my father's collection, I only know two or three from without the tropics, and none from higher latitudes than 40°.

No observations have hitherto been made on their manner of living; but analogy would induce us to conclude that it must be intermediate between that of a *Cetonia*, which feeds on flowers, and that of a *Melolontha*, which feeds on leaves.

Fam. VII. CETONIIDÆ.

Antennæ *articulis decem glabris, ante oculos vix sub clypei latere insertæ;*

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[a] *Hexodon unicolor* of Olivier and Fabricius appears to be only a variety of *H. reticulatum*.

Articulo basilari, magno, crasso, deflexo, tuberculiformi;

Capitulo 3-phyllo, ovato, longitudinem antennarum totam præter articulum basilarem æquante.

Labrum *membranaceum, clypeo absconditum, aut vix prominulum, margine antico ciliato, emarginato, lateribus rotundatis.*

Mandibulæ *compressæ, tenues, lanceolatæ, membranâ subquadratâ intus auctæ, hujus latere externo producto et basi vix corneis vel corneis.*

Maxillæ *corneæ, subtrigonæ, latere interno membranaceo, ciliato; processu terminali integro, sæpius compresso, setoso, fimbriâve hirsuto, laciniâve instructo.*

Palpi maxillares *articulo ultimo aliis longe majore, elongato.*

Palpi labiales *menti lateribus excavatis inserti, articulis duobus baseos brevibus.*

Mentum *et* Labium *connata, emarginato-bifida.*

Caput *quadratum, rarissime cornutum, clypei lateribus sæpius parallelis, diametro longitudinali et transverso æquatis aut illo majori; oculis prominulis vix clypeo insertis sed illi affixis.* Corpus *ovatum, sæpius depressum, semper planiusculum.* Thorax *forma irregulari; Scutellum sæpius distinctum.* Sternum *sæpe productum.* Pedes *graciles.* Tarsi *unguibus æqualibus, acutis, indivisis.*

OBSERVATIONS.

The membranaceous texture of the mandibles and maxillæ of the *Cetoniidæ* proves that these insects in the perfect state are intended to live on vegetable juices. Thus the *Cetonia Morio,* Fab., and probably many others of the

darker-coloured species are often to be found regaling themselves with the sap which flows from the wounds of trees; while *C. aurata,* F. with its more brilliant companions is only to be found on flowers.

Olivier united the Fabrician genus *Trichius* with *Cetonia:* and if indeed the state of the science at that time be taken into consideration, this arrangement was rather an improvement than otherwise; for the genera were few into which the *Petalocera* were then divided; and *Trichius* is so intimately allied to *Cetonia,* that with the early entomologists nothing could apparently be more useless than the institution of the genus, or more artificial than the principles upon which this institution was founded. Since the publication, however, of Olivier's work the science has made rapid progress, and *Trichius* may now with safety be regarded as a natural group of the *Cetoniidæ,* containing several genera, the institution of which is become necessary from the number of species that have of late years been added to our lists. That *Trichius* is a natural group is sufficiently clear from the larvæ of this genus living in putrescent wood, an economy in some measure different from the little that is known of *Cetonia,* and indeed from all we are acquainted with in the history of the other Thalerophagous *Petalocera.* The *Trichii* conduct us, almost without interruption, to the form of the *Glaphyridæ,* and it is not by any means unlikely that the habits of these two groups may in some respects approach nearer to each other than those of the first-mentioned insects and of the other *Cetoniidæ.* This family however may be distinguished from the *Glaphyridæ* by having their labrum concealed under the clypeus, whereas these last have it exserted and very prominent.

It has been already remarked, that while some *Scarabæidæ* are the only insects in the saprophagous circle which possess the porrect sternum of the *Cetoniidæ,* so some of the latter family are the only insects of the thalerophagous column which have their scutellum indistinct like many of the coprophagous insects. Again : if the *Scarabæidæ* are particularly remarkable among the petalocerous insects for the horns or inequalities on their clypeus and thorax, they have in this respect also an analogous relation to the *Cetoniidæ,* which form almost the only family of the thalerophagous circle as yet discovered that can boast of such peculiarities. On this account the genus *Goliathus* merits our attention; as we find that here the inequality of the clypeus constitutes a distinctive mark of the sexes as among the *Scarabæidæ.* The excavated or subcornuted thorax so common in the genus *Copris,* appears to be very rare with the *Cetoniidæ:* but even of this an example is afforded by *Cetonia cornuta,* Fab.; a singular insect from the Cape of Good Hope, which I have good reasons for believing to be the same species with the *Scarabæus Arcas* of Olivier!

The *Cetoniidæ* are in general very gay insects, as to colour; but rarely, if ever, can they be said to possess much metallic brilliancy, yielding in this respect to several of the *Rutelidæ, Glaphyridæ,* and *Anoplognathidæ.* Nothing however can exceed the beauty and lustre of the polish or the admirable variety of ornament with which their elytra are adorned. The larvæ live in the fattest vegetable soils: but notwithstanding the excellent observations of Degeer, much remains to be performed towards the elucidation of this part of their history.

It is difficult to collect sufficient data for the establishment of the geographical proportions of this family. It may nevertheless be observed, that there appear to be many more species within the tropics than there are without; and that the *Cetoniidæ* with a lobate thorax seem, with one or two exceptions only, to be all inhabitants of the new world.

Fam. VIII. GLAPHYRIDÆ.

Antennæ *decem-articulatæ, ante oculos sub clypei latere insertæ;*
Articulo basilari trigono, pilis longissimis instructo;
Capitulo triphyllo sæpius subgloboso.

Labrum *exsertum, crustaceum, transverso-quadratum, margine antico recto lineari.*

Mandibulæ *dilatatæ, corneæ, absconditæ, aut saltem vix prominulæ, latere interno coriaceo vel membranaceo.*

Maxillæ *processu externo membranaceo aut coriaceo, interdum multidentato, sæpius elongato et hirsuto, Cetoniidarum illum simulante; processu interno corneo dentato.*

Palpi maxillares *hirsuti, articulo ultimo reliquis majori.*

Palpi labiales *fere eadem longitudine quam maxillares.*

Mentum *hirsutum, subquadratum, vix emarginatum.*

Caput *veluti in Cetoniidarum familiâ, clypeo integro, quadrato, margine reflexo. Oculi clypeo cincti.* Corpus *ovatum, depressum, squamosum vel pilosum, elytris plerumque ad apicem dehiscentibus, abdomine brevioribus.* Thorax *subquadratus aut suborbiculatus; Scutello distincto.* Pedes *longi, femoribus posticis interdum incrassatis; Tarsi elongati* *spinosuli, unguibus anticis æqualibus, indivisis, posticis interdum solitariis.*

OBSERVATIONS.

All the *Glaphyridæ* yet known are confined to the old world, and within zones of 25 degrees breadth on each side of the tropics: at least no insect of this family has as yet been discovered within the tropics, nor have any been brought from higher latitudes than 45°. Though by no means composing a numerous family, they are interesting from the obvious parallel they afford to the *Aphodiidæ,* in their change from membranaceous mandibles to those of a more solid texture. The membranaceous process of the maxillæ, exserted labrum, and subquadrate clypeus, will serve to distinguish them easily from the *Melolonthidæ,* with which they have a most obvious connexion. These insects all appear to frequent flowers. Pallas is the entomologist who has made the most accurate observations on them: but little can be extracted from his remarks, except that the *Glaphyridæ* would seem principally to be vernal insects, and that many of them are fond of the liliaceous flowers, which are with us but rarely if ever attacked by coleopterous insects. Professor Pallas likewise says, that it is very probable that the larva of an insect of this family lives on the bulbs of the tulip, but gives no reason for this opinion.

These insects from the hairiness of their bodies must be very useful in promoting the fecundation of plants, and may in their native climates fulfil the same functions which are in this country performed by several *Hymenoptera*. The *Cetoniidæ,* or perhaps these, which are spring insects and very common in Greece, appear to have been the Μηλολάνθη of the ancients, a name which Fabricius erroneously applied to other insects which are hardly ever seen on flowers. Eustathius describes the *Μηλάνθη* or *Μηλολάνθη* or *Μηλολόνθη* (for it had all these names) as an animal larger than a wasp, and so called either from its being produced ἐκ τῆς μηλεῶν ἀνθήσεως, or from its flying about fruit-trees when they begin to flower. Were the attempt to determine an insect from so vague a description justifiable, I should say that in all probability the *Μηλολόνθη* of the ancients was the *Trichius fasciatus* so common over all the continent. This is a vernal beetle constantly on flowers, which flies exactly like an hymenopterous insect[a], and might easily be compared with a wasp in point of colour and marking, as well as in size, by a more experienced observer than we can suppose Eustathius to have been. Indeed, I hardly know a coleopterous insect that would more readily be compared with a wasp than the *Trichius fasciatus*. Nevertheless Mouffet, who assembles together all the various opinions of his day with the classical authorities on this subject, thinks that the ancient *Melolontha* was a green insect with a metallic lustre, and thus refers the name to *Buprestis sternicornis* and *B. Chrysis*, which he supposes to be male and female of the same species. But these insects being natives of India, it is very unlikely that the Greeks should have had a name for them, and above all that they should have derived this name from their manners. Besides, the true *Melolontha* was not only a native of Greece, but Hesychius and the Scholiast on Aristophanes both positively state that it was of a yellow or gold colour.

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[a] "Pendant le jour ils sont d'une grande agilité, et ils s'envolent alors avec facilité; c'est à dire, qu'ils sont toujours prets à voler; il leur faut três peu du temps pour ouvrir les étuis, au lieu que d'autres Scarabées balancent long temps avant que de prendre essor." Degeer, *Mémoires des Ins.* vol. iv. p. 300.

Fam. IX. MELOLONTHIDÆ.

Antennæ *articulis novem vel decem;*
Articulo basilari conico, elongato;
Capitulo elongato, lamellis pro generibus et sexu numero variis a tribus ad septem.

Labrum *margine antico obvio, aut tenui et lineari transverso, aut crasso tum infra profunde emarginato.*

Mandibulæ *corneæ, validæ, clypeo absconditæ, crassæ, subarcuatæ, formâ valde irregulari, lateribus externis sæpius rotundatis.*

Maxillæ *breves crustaceæ, intus arcuatæ, processu corneo dentibus munito.*

Palpi maxillares *prominuli, articulo ultimo ovali aut ovato, paulo crassiore.*

Mentum *veluti e duplici parte formatum, aliâ apicali, subquadratâ aut subovatâ truncatâ, ad apicem angustiori, margine supero late emarginato, ad angulos rotundato; aliâ basilari, prioris stipite, subcordatâ, apice truncato.*

Caput *subquadratum; clypei suturâ transversâ semper distinctâ, lateribus rotundatis, margineque reflexo.* Corpus *subconvexum ovatum; Elytris abdomine brevioribus.* Thorax *transversus, subquadratus; Scutello distincto.* Sternum *rarissime productum.* Pedes *graciliores.*

OBSERVATIONS.

This family I had once proposed to name *Sericidæ*, because the type is not *Melolontha vulgaris*, but *M. brunnea*, Fab., forming a genus analogous to *Trox*, and which I have separated from the Fabrician genus *Melolontha* under the name of *Serica*. As, however, it is desirable that the families should be designated after well known genera, the term *Melolonthidæ* has been adopted in preference to the new name now given to the real type of the family. The *Melolonthidæ* are the least brilliant of the Thalerophagous *Petalocera*, and in this respect, as well as their subglobose convex form, compose an excellent parallel to the *Trogidæ*. Another interesting analogy is, that of all this circle the *Melolonthidæ*, as far as we know their history, seem to frequent sandy soils the most; but of this disposition the best example will be afforded by the insects composing Latreille's 3d division of *Melolontha*, which are in fact the types of this family. We have already shown how they may be distinguished from the *Glaphyridæ*; and it remains therefore only necessary to state their principal difference from the *Anoplognathidæ*, which consists in the triangular labrum, plane mentum, extended sternum, and thick strong feet of these, in opposition to the emarginate or subemarginate labrum, inflected mentum, rarely produced sternum, and slender feet of the *Melolonthidæ*.

The present family consists of insects some of which are the most common and most destructive of *Coleoptera*: nevertheless, little is known as yet of their economy, and still less of their internal anatomy. They are found in every climate: but whether it be owing to any peculiar indecision with respect to the family, or to any other cause, I have not yet been able to collect data of sufficient importance to be the foundation of any attempt to discover the rules of their distribution in nature. The *Melolonthidæ* as well as the *Glaphyridæ* are remarkable for hirsute or scaly elytra. This peculiarity even appears to have been one of the earliest entomological observations of Linnæus, who in his *Animalium Specierum in Classes, Ordines, Genera, Species, methodica Distributio*[a], makes the following remark: "*Scarabæorum larvæ vivunt tranquillè sub terrâ: harum pleraque fimo delectantur, et eo pascuntur. Hirsutorum Larvæ sub radicibus plantarum degunt et easdem consumunt; at Volatiles foliis arborum pascuntur.*"

But one of the most constant characters of this family, and which is indeed peculiar to it with the *Anoplognathidæ*, is the transverse suture which divides as it were the clypeus into two parts just before the eyes. This character is worthy of attention, as it will serve to distinguish easily the saprophagous and thalerophagous circles from one another even at the point where they approach the nearest. Thus the *Dynastidæ* have not this suture, whereas in the *Anoplognathidæ* it is most evident, and can moreover be traced without any difficulty throughout the greater part of the neighbouring family of *Rutelidæ*.

Fam. X. ANOPLOGNATHIDÆ.

Antennæ 9- *vel* 10-*articulatæ;*

Articulo basilari elongato, conico; secundo subgloboso; septimo pateriformi brevissimo;

[a] Ed. Lugduni 1755, p. 113.

Capitulo 3-phyllo elongato, ovato.

Labrum *exsertum, trigonum, antice medio productum.*

Mandibulæ *subarcuatæ, corneæ, validæ, apice sæpius subemarginatæ.*

Maxillæ *mandibuliformes, subarcuatæ, corneæ, dentatæ vel inermes, sæpius edentulæ.*

Palpi maxillares *subclavati.*

Palpi labiales *breves, articulo extimo subovato.*

Mentum *subtransversum planiusculum, medio sæpius producto, basi palpigerum.*

Caput *semicirculare aut subquadratum;* Clypeo *suturâ transversâ distinctâ.* Corpus *ovatum.* Thorax *transversus, subquadratus; Scutello distincto.* Sternum *sæpius productum.* Pedes *robusti, femoribus posticis interdum incrassatis.*

OBSERVATIONS.

This family derives its name from an Australasian genus instituted by Dr. Leach, and which appears to be the type of the family. The triangular labrum, mandibuliform maxillæ, and singularly acuminate mentum, will of themselves be sufficient to indicate what other genera ought to be associated with *Anoplognathus* to form the family. At the same time due regard ought to be paid to the modifications which these several characters may undergo in different genera. But though the *Anoplognathidæ* will thus be found to be composed of a number of very distinct insects, no additions have yet been made to the original genus, with the exception of Mr. Kirby's remarkable genera *Geniates* and *Apogonia.*

The external appearances by which the sexes of insects are distinguishable from each other, though not forming a *convenient* test of the accuracy of a method of classification, compose nevertheless a field of discovery well worth the trouble of exploring. With the *Melolonthidæ* this difference is principally observable in the form of the clypeus and the antennæ, which often undergo modifications which vary in the sexes. In the *Anoplognathidæ*, on the other hand, the antennæ cannot be considered as presenting the most obvious distinction between the appearance of the sexes, though this may still chiefly consist in some organ or process of the head. Thus in the first division of the genus *Anoplognathus*, the clypeus of one sex is porrect and subquadrate, with the anterior margin reflexed, subtruncated and wider than at the base; while in the other sex the clypeus, though its anterior margin be still reflexed, forms a sort of semicircle attached by the suture to the frons. In the second division, that is, in Dr. Leach's proposed genus *Repsimus*, this sort of distinction becomes less apparent, and is replaced by a difference in the size of the posterior tibiæ. In others of the *Anoplognathidæ*, as the genus *Geniates* of Mr. Kirby, the male is distinguished by a stiff pencil of hairs affixed to the mentum, which is thus in a manner bearded, while the anterior tarsi are dilated. This dilatation of the anterior tarsi is a character not only wanting in the female of *Geniates*, but also in all the other petalocerous insects which have come under my inspection.

If we may judge from the singularity of their structure, the economy of these insects must be very remarkable. Their thick robust feet form indeed so great a contrast to those of the Thalerophagous *Petalocera* in general, that we are led to conjecture a proportionate difference in their manner of living. The *Anoplognathidæ* are, however, evidently phyllophagous; and I am inclined to believe that the larvæ of some of these insects are the New Holland *grubs*, said to be as useful to the natives as an article of food as they are injurious to the agricultural hopes of the European settlers. In this vast island and in South America the *Anoplognathidæ* are very numerous, and appear to take the place occupied in the old world by the *Melolonthidæ*. They are also (though not so plentifully) found in Europe and Asia, but on the whole appear never to recede farther from the equator than about latitude 45°. It may be proper here to mention that Mr. Kirby's genus *Apogonia*, which belongs to this family, and which he suspects to be South American, is ascertained from specimens in the cabinet of the Linnæan Society and in that of my father to belong to the East Indies.

CHAPTER IX.

CONCLUDING REMARKS.

CHARACTERS for the ten families of *Petalocera* more detailed than the preceding may perhaps have been expected of me; but to keep the middle path between a too copious and too meagre description of a natural group is perhaps one of the most difficult tasks that can be imposed on a naturalist. If brevity be aimed at, and the family be sketched in few words, objects however unlike its type are necessarily admitted, and confusion is the unavoidable result. If on the other hand the characters become numerous, there is a constant danger of something being excluded from its natural situation; because in proportion always to the number of details in the description is the liability of such to exceptions. In acknowledging however my inability to make the descriptions of the families more precise, I am led to imagine that this inability proceeds from a cause inseparable from the nature of the subject, and in a great degree independent of myself. So far then from laying any claim to the merit of precision, I could even wish, in offering the above characters to entomologists, that some expression implying doubt were prefixed to each. In describing species, each of which Nature has manifestly insulated, a failure in precision denotes an inability to seize their characteristic marks;—it is in short a glaring fault: but where, on the other hand, no distinct lines of demarcation have been imposed, as for instance, at the limits of families, the arrangement ought to be viewed with suspicion, according as the descriptions become precise. Let the family of *Geotrupidæ* be examined; it is the only one of the ten foregoing families which seems to have hitherto occurred to entomologists. Olivier first made it a division of his *Scarabæi;* Fabricius termed it a genus, and Latreille a family: it may therefore be considered as peculiarly distinct, having so early attracted the notice of such celebrated naturalists. Let us, I repeat, take the most obvious characters that have been proposed for this family, and examine whether they will apply to all the insects which properly belong to it. It may indeed be urged that if any insect does not conform to the characters laid down for the family, it cannot with accuracy be referred to it; but little ingenuity is requisite to perceive that such an argument amounts to the forcing of Nature to comply with the rules of an artificial system. The general habit and appearance of a nondescript species may leave not a shadow of doubt as to its true place in the order of existence; and nevertheless it may not agree with all the characters given by systematists to its real family. Those laid down by Latreille for the *Geotrupini* are excellent, and so far natural as they relate to the specimens which he had examined or even seen; but there are insects which belong to the family, and which nevertheless prove that almost every one of these characters ought to be considered as liable to exception. If, however, Latreille's descriptions be looked upon only as forming a type of construction to which these anomalous insects approach in a greater or less degree, we shall then be compelled to do honour to the ingenuity which could elicit characters so marked from such endless varieties of form. Still, it is not the distinct scutellum that constitutes the family of *Geotrupidæ,* for in the genus *Athyreus* this organ is not visible; nor yet are the exsert mandibles a distinctive character, for in *Elephastomus* they are concealed. Even if the antennæ be characterized as 11-jointed, genera such as *Hybosorus* and *Orphnus* occur having only ten articulations, or at least having the eighth joint indistinct and almost obsolete. Yet *Elephastomus, Athyreus, Orphnus,* and *Hybosorus,* have all the general habit and characters of the *Geotrupidæ.* In short, such is the variety of structure that I fear no solitary character can be considered as constant; and I can only say of the maxillæ, that they have been found less variable than other parts of the insect. As for the above characters which I have ventured to propose for the families, they could only be drawn from such insects as I had the means of dissecting; and it therefore may be anticipated, notwithstanding all the care bestowed on the designation of these groups, that insects will soon occur to prove that in this respect I am as subject as any of my predecessors to the charge of inaccuracy.

Families are then evidently artificial; that is, they are in the present state of the science considered natural only so far as they may be secluded from the rest by chasms which we are by no means to suppose to have been left by Nature, but rather to be the necessary result of our imperfect knowledge of species. Thus the *Cetoniidæ* seem at first sight to be a most natural family; but how near do we observe the *Glaphyridæ* to approach them?—nay, it is almost impossible to determine where a chasm occurs in the links which lead us on through the families of *Melolonthidæ, Anoplognathidæ,* and *Rutelidæ.* If then between the genus *Chasmodia* and the nearest genus to it of the *Cetoniidæ* a greater chasm than usual should occur, why should we conclude that the Creator has left the chain at this place imperfect?—This question is the more forcible, as Nature is plainly here proceeding towards the general habit of the *Cetoniidæ;* which indeed is evident as well from the place ascribed by Fabricius and Olivier to the modern *Rutelidæ* in their respective systems, as from that sort of bifid clypeus and labrum which is peculiar to *Chasmodia,* finding no parallel among the Thalerophagous *Petalocera* except in the family of *Cetoniidæ*[a].

If the families in the other circle and among the *Rectocera* are apparently more natural, that is, in the common acceptation of the word, more easily and precisely defined, it is only because there the natural chain is more imperfect, and the chasms more frequent. Yet it is remarkable how, as our knowledge of species is advanced by the labours of collectors, even these apparently natural (or more properly speaking, artificial) families are confined or encroached upon by newly discovered species. The genera *Elephastomus* and *Athyreus,* already alluded to, are proofs of this; why then may not an insect yet occur with membranaceous mandibles, of which it may be difficult to say whether it ought to be ranged with the *Geotrupidæ* or the *Scarabæidæ?*

In proportion as the chain of organized beings becomes more complete in a particular family, it is easy to see that there must be greater difficulty in its subdivision; and it is on this account that in the families which are considered to be the most *natural,* the difficulty of making what are termed *good* or *natural* genera is the greatest. It is not that several very distinct peculiarities of structure which might lead at once to generic characters are not to be observed in certain species of the family; but then, unfortunately for a certain class of naturalists, each of these peculiarities is so gradually shaded off into some one of the others, that it is impossible to fix accurately the place where any of them absolutely ceases. A strange paradox is the consequence; namely, that in those very places where Nature is most perfectly displayed to our view, she is often thought to be the most difficult to comprehend.

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[a] *Cetonia Brownii.* Kirby *Trans. Linn. Soc.* vol. xii. p. 465.

It has moreover been no little misfortune to the science that the study of exotic insects should have been comparatively neglected. The common saying, that we ought first to be well acquainted with our own indigenous insects before we meddle with exotic, is erroneous, inasmuch as to comply with it is impossible. It has led to notions of natural genera and natural families[a], that depended more on the extent of the cabinets and collections studied by the entomologist than on any distinctions made by Nature. He indeed, who flatters himself with the idea that the families, tribes, genera, and sections, which he has laid down on paper are so many natural *divisions*, can only be compared to the person who, because he may find the meridians and other circles of an armillary sphere convenient for the division of the heavens, should therefore imagine that they must exist in nature. In one and the other case artificial modes of distribution are resorted to, which, however ingenious in themselves, are but sad proofs of the limited state of our faculties, when we consider that without such instruments the vastness and sublimity of the Creation cannot be comprehended.

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[a] "Dispositio insectorum sistit divisiones sive conjunctiones eorum; et est artificialis quæ classes et ordines, vel naturalis quæ *genera*, species, et varietates docet." *Phil. Ent.* 78.

Linnæus falls into the same mistake, when he says "Classis et ordo est sapientiæ, genus et species Naturæ opus." *Syst. Nat.* i. 13.

It is curious to observe the inconsistencies into which the most sagacious men are led by erroneous opinions. Fabricius, after having laid down as above that *genera* are natural, thus defines them: "Genera tot sunt quot similiter constructa instrumenta cibaria proferunt diversæ species naturales." *Phil. Ent.* 80. From which it must evidently follow that the *instrumenta cibaria* afford natural characters. Yet soon after he says, "Dispositionem artificialem a solis instrumentis cibariis desumpsimus." *Phil. Ent.* 85. That is, from the very organs that he had previously made to afford characters proper for a natural classification!

But it may be objected, that since families are artificial there ceases to be a farther use for them in any system professing to be natural: the same however may be said of genera, which, when they are not osculant, experience proves to be even more artificial than families:—yet of what astonishing service has the institution of genera been to our knowledge of the creation[a]! It is not the use of families or genera that is hurtful to science, but the bending of Nature to enter by force into these several divisions of our own invention, which we are always induced to do the moment we deceive ourselves and imagine them to be natural.

The foregoing families I do not offer therefore as groups precise and well defined; nay, such I conceive it impossible to make: but if they can be imagined as each containing a peculiar type of formation, to which all in it are in some

[a] It will however be easily seen from the foregoing pages, that I by no means subscribe to the doctrine, that "generum characteribus fixis tota nititur scientia entomologica." *Phil. Ent.* 88.

degree assimilated, though subject to various shades of difference that at length lead them into a neighbouring family, this idea will perhaps be found more consonant to what is observed in nature than any other which can be proposed. It was with this view of the subject that I endeavoured to discover the types of formation, or to pitch upon such insects as seemed to possess a peculiar construction, to which all the others more or less approached. The attempt seemed so far useful, as it might lead a person without possessing a collection for study, to acquire a very perfect idea of all the various forms of *Petalocera* which were likely to occur to his notice. And it was accordingly imagined that they might be represented by some of the most familiar insects as follows:

Geotrupes stercorarius, *Lat.*
Scarabæus sacer, *L.*
Aphodius Fossor, *F.*
Trox sabulosus, *F.*
Oryctes nasicornis, *Illig.*
Rutela lineola, *Lat.*
Cetonia aurata, *F.*
Amphicoma hirta, *Lat.*
Melolontha brunnea, *F.*
Anoplognathus viridiæneus, *Leach.*

There are few collections so poor as not to boast the possession of these ten insects, an intimate acquaintance with which is all, I venture to affirm, that is requisite for a general knowledge of the structure of the *Petalocera*[a]. At the same time as only five of them are British, it may be well to observe how necessary for the entomologist is the study of exotic insects.

It only remains, by way of conclusion, to say a few words on the principal objections that may be brought against the preceding observations. 1st, That though characters drawn from the organs of manducation may be natural, yet from their minuteness they are not easily seized, and require too much time for study. 2dly, That the principles of arrangement here laid down are too difficult for general adoption.—To the first of these I shall only reply, that in botany microscopical dissections of a much more minute and difficult nature are often practised, and have led to the most curious and satisfactory results. And to the second objection I cannot answer better than in the terms of an illustrious botanist[a], who has lately discovered something in the disposition of the natural family of the *Compositæ* analogous to what I have observed in the *Petalocera.*

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[a] It is to be observed that no account is made here of osculant genera.

" *Quand on se propose de faire une classification naturelle, il faut avant tout se résigner à voir la Nature absolument telle qu'elle est, et non pas telle que nous la disposerions pour la commodité de notre étude. Cette réflexion suffit pour réfuter toutes les objections qui ont été faites contre notre travail.*

" *La multiplicité de nos tribus, la minutie et l'équivoque de leurs caractères toujours difficiles à observer, et souvent réduits à des nuances indécises, enfin l'impossibilité d'approprier cette méthode de classification à l'usage habituel dans la pratique ordinaire de la botanique ; tous ces défauts ou plutôt tous ces inconvéniens ne sauroient nous être imputés s'ils résultent nécessairement de la nature même des*

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[a] *Dict. des Sciences Naturelles,* Art. *Composées.*—Soon after I had explained the curious developement of the Lamellicorn insects in circles to my friends Dr. Leach and Mr. Ritchie in Paris, a number of the new *Dictionnaire des Sciences Naturelles* appeared, in which the latter gentleman pointed out to me M. Cassini's *tableau.* This however, though I am not botanist enough to understand it fully, seems to have been drawn up on the first slight and very imperfect glimpse obtained of the remarkable disposition of Nature.

choses. En conclura-t'on qu'il faut renoncer à classer naturellement les Synantherées et s'en tenir à une classification artificielle? Nous répondrons avec M. de Mirbel (Elémens de Botanique) *que le but que se propose le botaniste est moins de rendre la science facile, que solide, profonde et vaste.*"

APPENDIX.

Genera Entomologica ad animadversiones præcedentes illustrandas, necnon quædam nova ad naturalem Petalocerorum ordinem detegendum nunc primum constructa.

COLEOPTERA, Herbivora antennis clavatis, capitulo plerumque triphyllo; pedibus fossoriis, tibiis extrinsecùs dentatis vel spinosulis, duobus anticis præsertim; tarsis plerumque pentameris.

Observatio. Divisio fere artificialis, et nisi quod commoda sit vix retinenda.

I. RECTOCERA.

Antennæ quasi fractæ capitulo haud flabellato. *Mandibulæ* valde exsertæ.

Obs. Familiarum Synopsi haud elaboratâ, opus volui minimè ingratum amicis peritioribus committere. Multa vero tentamini obstant, quæ vel specierum cognitarum e paucitate vel e discrimine sexuali, in his quàm difficili, orta sint.

A. *SAPROPHAGA.*

Hister, *Linn.* Histeroides, *Gyllen.* Histeridea, *Leach.*

Antennæ sæpius undecim-articulatæ, clavâ triphyllâ, compactâ. Elytra abdomine breviora. Caput sæpius parvum, retractum.

Obs. Confer Paykullii et Leachii Monographias, hanc ad genera cognoscenda, illam ad species determinandas necessariam.

B. *THALEROPHAGA.*

Lucanus, *Linn.* Lucanides, *Lat.* Lucanoides, *Gyllen.* Prioceri, *Dum.*

Antennæ sæpius decem-articulatæ; Capitulo pectinato, fissili, vel subserrato vel subcompacto.

Elytra abdomen obtegentia. Caput magnum, exsertum.

Rectocerorum Thalerophagorum Generum Synopsis.

Familiæ.	*Characteres.*			*Genera annectentia.*	*Genera osculantia.*
1. Lamprimidæ.	Maxillæ elongatæ.			Pholidotus.	
	Maxillæ breves	Antennarum capitulo pectinato.		Ryssonotus.	
		Antennæ subclavatæ.		Lamprima[a].	
				* * * *	
2. Aesalidæ.				Æsalus.	
				* * * *	
3. Syndesidæ.				Syndesus.	
				* * * *	
4. Passalidæ.	Antennarum capitulo 5-lamellato.			Paxillus.	
	Antennarum capitulo 3-lamellato.			Passalus.	
					Chiron, *Scolytidis affinis?*
5. Lucanidæ.	Maxillarum laciniâ internâ crustaceâ.	Maxillæ unco corneo instructæ.		Nigidius.	
		Maxillæ haud unco corneo instructæ.		Figulus.	
					Sinodendron, *Dynastidis affine.*
	Maxillarum laciniâ internâ membranaceâ.	Antennæ subperfoliatæ.	Mentum antice integrum.	Dorcas.	
			Mentum antice emarginatum.	Ægus.	
		Antennæ capitulo pectinato.	Labium bifidum.	Lucanus.	
			Labium integrum.	Ceruchus.	
					Platycerus, *Trogositis affinis.*

[a] *Lethrus* genus osculans *Petaloceris* potius referendum.

Fam. LAMPRIMIDÆ.

Antennæ thorace breviores; articulo basilari elongato, conico, recto, tribus vel quatuor lamellis capitulum efformantibus.

Labrum penitus tectum vel deflexum.

Mandibulæ (maribus saltem) maximæ, intus hirsutissimæ, apice multidentatæ.

Labium bilobum, hirsutissimum; *Mento* subquadrato. Corpus convexum vel convexiusculum; Caput thorace multo angustius. Thorax lateribus deflexis, elytris latior.

I. *Genus.* PHOLIDOTUS.

Antennæ articulo basilari aliis conjunctim fere longiore.

Mandibulæ (mari saltem) capite triplo longiores, apice incurvæ, dentatæ, intus serratæ, hirsutissimæ.

Maxillæ processu terminali elongato, ut in Lucanis penicilliformi.

Palpi elongati, gracillimi; Maxillares articulo tertio ultimo vix longiore.

Mentum hirsutissimum, subsemicirculare, labii lobis penicilliformibus.

Caput subquadratum, transversum, vix emarginatum. Corpus subdepressum, thorace quam in Lamprimis convexo, at sterno vix producto. Tibiæ anticæ extus serratæ, 6-dentatæ. Tarsi appendice sub unguium origine insertâ, elongatâ, ad apicem bidentatâ.

OBS. Instrumentis cibariis accurato examini etiamnum subjiciendis, diagnosis generica valde incerta est Pholidoto.

SPEC. 1. *Pholidotus lepidosus.*

P. atroferrugineus nitidus, squamulis argenteis confertissimè aspersus, tarsis nigris.

MAS mandibularum apice interno bidentato; Capite lineis duabus elevatis angulum formantibus.

Mus. D. MacLeay.

FEMINA hactenus incognita[a]?

Habitat in Braziliâ.

II. *Genus.* RYSSONOTUS.

LUCANUS, *Kirby.*

Antennæ articulo basilari aliis conjunctim vix longiore; capitulo pectinato, haud abrupte distincto.

Mandibulæ apice multi-dentatæ, dentibus tribus intùs instructæ.

Maxillæ breves, penicilliformes, vix ultra articulum Palporum secundum attingentes.

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[a] Insectum quoddam Braziliense genus novum forsan constituat, sed Pholidoto affinitate proximum videtur.

CASIGNETUS?

Antennæ articulis tribus ultimis clavam quam in Histeribus perfoliatam formantibus.

Palpi breves; maxillarium articulo secundo brevissimo.

Mentum transversum, semicirculare.

Caput trigonum Geotrupis singulariter illum simulans; Corpore thoraceque depressis. Sternum vix productum. Articulus tarsorum quintus ante ungues processu longissimo bifurcato armatus.

Spec. *Casignetus geotrupoides.* Anne Pholidoti femina?

C. fusco-violaceus, capite thorace elytrisque versus scutellum scabrosis, corpore subtus æneo squamis argenteis asperso.

Mas nondum detectus?

Femina mandibulis depressis, quam in Geotrupe stercorario acutis arcuatis.

Mus. D. MacLeay.

Obs. Insectum Lamprimis habitu proximum. Equidem nullus dubito instrumentis cibariis adhuc neglectis, et sexuali discrimine tantas difficultates obstante, quin genus proprium efformare vix habendus sit Casignetus. At nemini utinam displiceat, insectum quod ita benevolis entomologiæ cultoribus apertiùs manifestetur, hoc modo me nunc descripsisse.

Palpi elongati gracillimi; Maxillares articulis arcuatis, tertio ultimo breviore.

Mentum transverso-quadratum antice emarginatum.

Corpus depressum, capite transverso-quadrato. Sterni rudimentum distinctum. Tibiæ anticæ extùs sexdentatæ, tarsorum appendice sub unguium origine insertâ, setosâ.

Obs. Thorax medio canaliculatus, inæqualiter rugosus; Scutello triangulari. Genus corpore, capite, et mandibulis Lamprimæ, at Lucani antennis indutum, ut cuivis insecta intuenti statim patebit.

Spec. 1. *Ryssonotus nebulosus*.

R. niger obscurus, elytris fuscis cinereo-nebulosis, thorace punctato: dorso late canaliculato foveis quatuor utrinque insuper impressis.

Mus. D. MacLeay.

Lucanus nebulosus. *Kirby, Trans. Linn. Soc.* vol. 12. p. 411.

Habitat in Australasiâ.

Sexuum diagnosis haud rite cognita.

III. *Genus.* LAMPRIMA, *Latreille.*

LUCANUS, *Schreibers.* LETHRUS, *Fab.*

Antennæ articulo basilari aliis conjunctim breviore; capitulo subgloboso foliato, articulis quatuor formato, quorum primus minimus dentiformis vix conspicuus.

Labrum minimum, inter mandibulas deflexum, latitans oblongum, suprà carinatum, angulis anticis rotundatis, hirsutis.

Mandibulæ maximæ, crassæ, et maris saltem intus hirsutissimæ.

Maxillæ brevissimæ, setosæ.

Palpi breves, crassiusculi, articulis subovatis; Maxillares articulo ultimo illo antecedente longiore.

Labium membranaceum, bilobum, pilosum.

Mentum transverso-lineare vel potius semi-ellipticum, margine antico convexo.

Corpus ovale. Caput oblongo-quadratum, antice emarginatum, triangulo medio magno, subexcavato, marginibus elevatis, glabris, antice ante oculos subprominentibus. Thorax convexus, margine utrinque angulato, deflexo. Pectus canaliculatum, punctatum. Sternum in cornu productum. Tarsi spinâ sub unguium origine insertâ, gracili, apice divisâ.

MAS. Mandibulæ porrectæ, validæ, capite fere duplo longiores, intus hirsutissimæ. Tibiæ laminâ corneâ, triangulari, apicali calcari adjunctâ.

FEMINA. Capitis triangulum quam in mare obsoletius. Mandibulæ multo breviores, fere glabræ. Thorax magis punctatus et scaber. Tibiæ anticæ multo graciliores, apice minus emarginatæ, pilis aliquot ferrugineis solitariis, denteque ad angulum internum laminæ loco corneæ sat-longo, acuto.

OBS. Ultimus clavæ articulus fere bifidus, oculis quapropter quibusdam Antennæ undecim-articulatæ videantur! An quo genus reverâ Australasicum Geotrupidis hæret nexûs aliam detegamus notam?

SPEC. 1. *Lamprima aurata.*

L. viridi-aurea nitens, pectore plano.

MAS capite angulis obtusis; mandibulis apice 3-dentatis, intus unidentatis; elytris subrugosulis haud lævibus; tibiis anticis vix punctatis, 6-dentatis, dentibus tribus ultimis subremotis.

L. aurata. *Lat. Nouveau Dict. d'Hist. Nat.* vol. xvii. p. 278.

Lamprima ænea. *Lat. Genera Crust. et Ins.* vol. ii. p. 152.

Lamprima ænea. *Lat. Hist. Nat. des Crust. et Ins.* vol. x. p. 240.

Lucanus æneus. *Don. Ins. of New Holland,* tab. i.

Lucanus æneus, Var. *Schreibers, Trans. Linn. Soc.* vol. vi. p. 187.

Lethrus æneus. *Fab. System. Eleuth.* tom. i. p. 2.

β. Var. parva tibiis anticis quinquedentatis.

γ. Var. cupreo-aurata.

Femina thorace elytrisque quam in maribus magis punctatis, tibiarum anticarum spinis conicis, rectis.

Lamprima cuprea. *Lat. Nouv. Dict. d'Hist. Nat.* vol. xvii. p. 279.

β. Var. cæruleo-viridis.

γ. Var. cupreo-aurata.

Spec. 2. *Lamprima Latreillii.*

L. cæruleo-viridis nitida, elytris lævibus punctatis, pectoris canali utrinque puncto impresso.

Mas mandibulis apice 3-dentatis, intùs unidentatis; tibiis anticis 6-dentatis, dentibus æquè dissitis.

Lucanus æneus, Var. cærulea? *Don. Ins. of New Holland*, tab. i.

Femina adhuc latet.

Obs. In honorem Dom. Latreillii, qui, in Entomologiâ hodiernos ante omnes longe latèque celebris, ordinem insectorum naturalem primus indagavit.

Spec. 3. *Lamprima ænea.*

L. aurato-viridis, elytris rugulosis, corpore subtus piloso.

Mas mandibulis apice vix 2-dentatis, intus unidentatis; tibiis anticis 7-dentatis.

Lamprima ænea. *Lat. Nouv. Dict. d'Hist. Nat.* vol. xvii. p. 279.

Lucanus æneus. *Schreibers, Trans. Linn. Soc.* vol. vi. p. 185.

Lethrus æneus. *Fab. Syst. Eleuth.* tom. i. p. 2.

Obs. Variat anticarum tibiarum numero dentium 6—8.

Femina nigro-ænea cum nitore violaceo; thorace quam in maribus magis punctato.

β. Var. fere nigra.

Lucanus æneus. Fem. *Schreibers, Trans. Linn. Soc.* vol. vi. p. 188.

Spec. 4. *Lamprima pygmæa.*

L. aurato-viridis nitens, elytris læviusculis vix punctatis.

Mas capite angulis subacutis; mandibulis apice bidentatis intus unidentatis; tibiis anticis septem-dentatis; corpore subtus glabro.

Femina latet.

Obs. I. Generis quidem rari, difficillimi, et ad methodum naturalem exponendum pretiosissimi mihi nunc species vix sexus determinasse liceat. Hoc vero in tentamine consultiùs duxi Schreibersii quoad sexus diagnosem vestigia sequi quam cel. Latreillii, qui sententiam scilicet ut Lamprimæ mandibulis haud porrectis species distinctæ sint putandæ primus prætulit. Sexuale autem inter Rectocera discrimen tantæ difficultatis est, tantique fortasse momenti ut leviter perstringi non debet sed ad accuratius examen revocari.

Obs. II. Species ac varietates superscriptæ, quibus omnibus, quod obiter notatu vix indignum sit, ad suturam striâ obsoletâ utrinque impressa sunt elytra, in Mus. MacLeayano hospitantur.

Fam. AESALIDÆ.

Antennæ articulo basilari incurvo, compresso.

Labrum distinctum.

Maxillæ processu apicali brevissimo; interno nullo vel haud exserto.

Labium integrum, minimum, glabrum.

Mentum transverso-quadratum.

Corpus supra valde convexum.

Obs. Hujus familiæ characteres specie unâ solum cognitâ haud facile sunt desumendi. An igitur familia sit vera, vel genus osculans tantummodo censeatur, affirmare nequeo; fateor enim Aesali locum in systemate jam memoratum non eum esse qui omni ex parte mihi arrideret. Attamen res ulterius examen requirit, et naturæ assectatoris strenuissimi, qui Aesali larvam detexerit, quæstionem, nisi fallor, proprium sit expedire.

IV. *Genus.* AESALUS, *Fabricius.*

AESALUS, *Lat.* LUCANUS, *Creutzer. Panzer.*

Antennæ capitulo perfoliato.

Mandibulæ apice acutæ, arcuatæ, sublunatæ, superne mascu in ramum cornuve obtusum productæ.

Maxillæ brevissimæ, haud distinctæ, processu compresso, apice rotundato hirsuto.

Mentum breve, planum, truncatum, integrum.

Corpus quadratum, ad apicem rotundatum. Thorax immarginatus, margine antico concavo caput excipiente. Tibiæ latæ, compressæ, extus inæqualiter multidentatæ.

OBS. Antennis, thoracis charactere caput excipientis, et tibiis examini subjectis, hoc genus Histeribus affiniusculum esse videatur; sed instrumenta cibaria adhuc sunt examinanda.

SPEC. 1. *Aesalus scarabæoides,* Auctorum.

Fam. SYNDESIDÆ.

Antennæ glabræ, vix fractæ, articulo basilari elongato, conico, arcuato.

Labrum haud distinctum.

Mandibulæ maris capite duplo longiores.

Labium et *Mentum* brevissima, vix distincta.

Caput brevissimum, transversum. Thorax velut in Passalidis ab abdomine magno intervallo disjunctus. Corpus elongatum convexum, coleoptrorum lateribus abruptè declivibus, scutelloque inter elytra producto. Pectus magnum. Pedes haud breves, postico pare ab aliis distante.

OBS. Hujus familiæ diagnosis eâdem de causâ quam Aesalidarum forsan fallax, at familia ipsa vera.—Quanti tamen hiatus replendi, quot nodi peregrinatoribus adhuc solvendi sunt!

V. *Genus.* SYNDESUS.

SINODENDRON, *Fab.* LUCANUS, *Don.* LAMPRIMA, *Lat.*

Antennæ articulo secundo subgloboso, tertio majori conico, reliquis septem (masculis saltem) clavam lamellatam, magnam, rotundatam, depressam formantibus.

Mandibulæ elongatæ, fere rectæ, conicæ.

Palpi Maxillares mandibularum fere longitudine, articulo ultimo cylindrico, ovato, aliis longiore.

Corpus cylindricum, capite oculis conjunctim vix latiore. Scutellum minutum. Thorax convexus sulco dorsali longitudinali. Tibiæ anticæ serratæ, extus dentatæ.

OBS. Genus quidem singulare corporis formâ, antennis, thorace ab abdomine et pedum postico pare ab aliis distantibus Passalis propinquans; at vero quâ cum Aesalo devincitur affinitas haud satis patet.

SPEC. 1. *Syndesus cornutus.*

S. obscure ferrugineus, capite emarginato angulis porrectis, thorace punctato antice subcornuto, elytris crenato-striatis.

MAS mandibulis apice bidentatis.

Mus. D. MacLeay.

FEMINA simillima, at mandibulis haud porrectis inermibus.

Sinodendron cornutum. *Fab. Syst. Eleuth.* vol. ii. p. 377.

Lucanus parvus. *Don. Insects of New Holland,* tab. i. 4.

Lamprima. *Lat. Regne Animale,* vol. iii. p. 290.

Habitat in Terrâ Van Diemenii.

OBS. Hocce insectum cel. Fabricius descripsit dicendo, "Antennæ lamellis sex:" at maris antennæ decem-articulatæ sunt clavæ lamellis septem distinctè observandis. Feminam non adhuc vidi.

Fam. PASSALIDÆ.

Antennæ sæpius villosæ, arcuatæ, vix fractæ, articulo basilari parum elongato.

Labrum magnum, crustaceum, penitus exsertum.

Mandibulæ breves, dentatæ, arcuatæ.

Maxillæ processubus corneis dentiformibus, spinosis, intùs dentatis, apicali validiore.

Palpi Labiales menti dorso insertæ.

Mentum crustaceum, subquadratum, fossulâ utrinque versus basin impressâ.

Corpus oblongum, depressum. Thorax ab abdomine magno intervallo disjunctus. Scutellum in abdominis pedunculum immersum. Coleoptra lateribus abrupte deflexis. Pedes breves, postico pare pectoris causâ ab aliis distante.

OBS. In hac familiâ, cujus diagnosis nondum prorsus detegatur sexualis, characteres offerunt perutiles maxillæ et mentum.

VI. *Genus.* PAXILLUS.

PASSALUS, *Lat. Web.*

Antennarum clavâ quinque lamellis.

Labrum transverso-lineare, fere glabrum.

Palpi subcrassi; Maxillares articulo ultimo aliis conjunctim fere longiore, subovato, apice subacuto; Labiales ad fossulas menti anticas inserti, articulis crassis, secundo et tertio fere eadem latitudine.

Maxillæ processu apicali dentiformi, acuto; interno unidentato.

Mentum subquadratum, latum, ultra palpi labialis articuli extremitatem secundi utrinque extensum, lateribus rotundatis, margine antico lobato tricuspidato.

Thorax canaliculatus. Pedum par secundum extùs vix pilosum.

OBS. Paxilli Passalis efformantes simillimum genus quod Syndeso antennis labroque minore convenire ducatur, ex Americâ meridionali hactenus solum apparuerunt.

SPEC. 1. *Paxillus Leachii.*

P. ater nitidus, corpore valde depresso, thoracis lateribus punctatis: angulis anticis planis, elytris punctato-striatis, tibiis anticis extùs 4-dentatis.

Mus. D. MacLeay.

OBS. Amicitiæ nomen dedi.

SPEC. 2. *Paxillus crenatus.*

P. ater nitidus, thoracis lateribus punctatis: angulis anticis profunde impressis, elytris crenato-striatis, tibiis anticis extùs 6-dentatis.

Habitat in Brasiliâ, Demerarâ.

Mus. D. MacLeay.

OBS. Corpus quam P. Leachii convexius.

VII. *Genus.* PASSALUS, *Fabricius.*

PASSALUS, *Fab. Lam. Lat.* LUCANUS, *Linn. Degeer. Oliv.*

Antennarum clavâ trilamellatâ.

Labrum transverso-quadratum.

Palpi Maxillares crassi, articulo ultimo aliis conjunctim breviore, cylindrico, apice obtuso. Labiales mediocres ad anticam menti fossulam inserti, articulo ultimo graciliore.

Maxillæ processu apicali subtrigono, in dentem acutissimum desinente; interno bidentato.

Mentum subquadratum, ultra palpi labialis articuli extremitatem secundi haud extensum, lateribus subrotundatis, margine antico lobato, tricuspidato.

Par pedum secundum pilis ferrugineis extùs densissime obtectum.

SPEC. 1. *Passalus interruptus,* Auctorum.

OBS. *P. emarginatus, cornutus,* &c. huic generi associandi.

VIII. *Genus.* CHIRON.

SCARITES, *Fab.* SINODENDRON, *Fab.* PASSALUS, *Illiger. Lat.*

Antennæ novem-articulatæ, articulo basilari elongato, cylindrico, secundo globoso, tertio conico, 4°, 5° et 6° brevissimis, reliquis tribus clavam ovatam formantibus.

Labrum transverso-quadratum, penitus exsertum.

Mandibulæ breves, vix exsertæ, validæ, arcuatæ.

Palpi Maxillares graciles, menti versus apicem inserti, articulo ultimo subulato, tertio subconico sed vix secundo longiore.

Mentum semicirculare vel potius subtrigonum.

Corpus cylindricum, elytris abdomen haud obtegentibus. Caput transversum, ab thorace nullo intervallo disjunctum, sed eâdem omnino latitudine. Scutellum minimum vix distinctum inter elytra productum. Pedes sat breves, femoribus incrassatis, tibiis anticis dilatatis digitatis.

OBS. Hujus generis apud Cel. Latreillium primum indicati, maxillas haud examinavi. Sexualis distinctio adhuc latet.

SPEC. 1. *Chiron digitatus.*

C. ater nitidus, thorace punctulato, elytris punctato-striatis, suturâ pedibus corporeque subtùs ferrugineis.

Sinodendron digitatum. *Fab. Syst. Eleuth.* vol. ii. p. 377.
Scarites cylindricus. *Fab. Ent. Syst. Supp.* xliv. 8.
Passalus Cylindrus. *Illig. Mag. fur Inseck.* i. 163.
* * * * *Lat. Regne Animale,* vol. iii. 292.

Habitat in Indiâ Orientali. Mus. D. MacLeay.

OBS. Hujus insecti anomali Passalos ut mihi videtur Scolytidis nectentis D. Illiger cum prioribus affinitatem de capitis antennarum pedumque characteribus facillimè perspiciendis primus deprompsit. Chironis vero structura antennis novem-articulatis, clavâ trilamellatâ compressâ, corporis pedumque formâ a Scolytidis, Platypo præsertim, haud longe recedit.

Fam. LUCANIDÆ.

Antennæ glabræ, fractæ, articulo primo longissimo, subcylindrico, clava 3 vel 4 lamellis.

Labrum sæpius cum clypeo connatum, rarissime distinctum.

Mandibulæ in maribus maximæ.

Maxillæ externe compresso-dilatatæ laciniâ apicali coriaceâ compressâ setosâ.

Palpi articulo ultimo elongato, ovali; Maxillares plane longiores, articulo secundo tertio multo longiore. Labiales articulo ultimo antecedente multo longiore.

Labium membranaceum, mento fere absconditum, laciniis duabus apicalibus hirsuto-penicillatis.

Mentum magnum, transverso-quadratum vel subsemicirculare.

Corpus sæpius depressum, elytris abdomen obtegentibus. Clypeus formâ irregulari, variâ. Thoracis margo posticus ab abdomine haud longe remotus. Scutellum plerumque distinctum. Pedes sæpius elongati, antici præsertim.

IX. *Genus.* NIGIDIUS.

Antennæ articulo secundo subgloboso, distincto; Clavâ trilamellatâ pectinatâ.

Labrum exsertum, crustaceum, minutum, bilobum.

Mandibulæ breves, triquetro-trigonæ, validæ, arcuatæ.

Maxillæ processu apicali setoso fimbriave hirsuto, apice obtuso, latere externo convexo, laciniâ internâ subtrigonâ, concavâ, ad apicem intus unco corneo instructâ.

Palpi Maxillares articulo primo minutissimo, secundo elongato conico, tertio brevi subconico, ultimo multo longiore, conico, apice obtuso. Labiales articulo primo elongato, gracili, processu pectinato armato, secundo brevi subgloboso, tertio crassiori obtuso.

Labium hirsutum; mento transverso-quadrato, plano, margine antico emarginato.

Corpus parallelopipedum depressum. Caput trapeziforme, oculos amplectens. Thorax canaliculatus, ab abdomine brevi intervallo disjunctus. Scutellum inter elytra distinctum minutum triangulare.

OBS. Genus Passali formam pulcherrimè simulans et ei omnino affine.

SPEC. 1. *Nigidius cornutus.*

N. ater nitidus, mandibulis tridentatis, clypeo punctato antice mucronato, elytris inter strias elevatas triplici punctorum impressorum ordine instructis: apicibus punctatis, tibiis anticis 7-dentatis.

MAS mandibularum margine supero et externo in ramum cornutum producto.

FEMINA mandibulis brevioribus haud cornu supero instructis.

Habitat in Australasiâ.

Mus. D. MacLeay.

X. *Genus.* FIGULUS.

LUCANUS, *Oliv. Fab.*

Antennæ articulo secundo minutissimo, vix distincto, clavâ trilamellatâ.

Labrum haud distinctum.

Mandibulæ breves, validæ, triquetro trigonæ.

Maxillæ laciniâ apicali securiformi, setosâ vel pilis longissimis formatâ, internâ crustaceâ, ovatâ, compressâ, haud unco corneo armatâ.

Palpi Maxillares articulo secundo crassiore, cylindrico, tertio præcedente haud breviori, ultimo longiori ovato, apice obtuso.

Mentum transverso-quadratum, concavum, margine antico emarginato.

Corpus parallelopipedum depressum. Caput transversum, oculos amplectens, margine antico recto. Thorax canaliculatus, ab abdomine brevi intervallo remotus. Scutellum minutissimum, lineare, inter elytra immersum.

OBS. Genus Passalis quoque simillimum, sed labri maxillarumque causâ quam Nigidius ab illis remotius. Huic generi et antecedenti nomina dedi in honorem Nigidii Figuli equitis Romani, qui Scarabæos cornubus prælongis bisulcis dentatis forcipibus in cacumine Lucanos primus vocasse apud Plinium memoratur.

SPEC. 1. *Figulus striatus.*

F. ater nitidus, mandibulis apice 3-dentatis, clypeo concavo obscure punctato, thorace quadrato antice unidentato: lateribus punctatis, elytris punctato-striatis apice punctatis.

MAS. Tibiis anticis extus 8-dentatis.

FEMINA? Minor tibiis anticis extùs 6-dentatis.

Lucanus striatus. *Oliv. Ins.* i. 19. tab. 4. fig. 14.

Lucanus striatus. *Fab. Syst. Eleuth.* vol. ii. p. 253.

Habitat in India Orientali, Insulis Mauritio Bourbonensi.

Mus. D. MacLeay.

OBS. Mandibulæ profecto quidem tridentatæ, quamvis unidentatæ apud Olivierium et Fabricium dicuntur. An eadem species? Descriptiones vero cel. auctorum insecto nostro alias aptissime conveniunt.

XI. *Genus.* DORCUS*, *apud Germanos in Specierum Catalogis.*

LUCANUS, *Linn. Fab. Oliv. Lat. Web.* PLATYCERUS, *Lat.*

Antennæ clavâ fere perfoliatâ, quadrilamellatâ, articulo ultimo majori semicirculari.

Labrum clypei fere processus exsertus, corneus, transversus.

Mandibulæ arcuatæ vel falcatæ, breves, intùs dentatæ.

Maxillæ processu apicali recto, cylindrico, membranaceo, pilis fimbriato; laciniâ internâ membranaceâ, dilatatâ.

Palpi Maxillares elongati, articulis tribus ultimis compressis ultra clypeum eminulis, secundo lato conico, tertio brevi conico, quarto longiore ovato, apice obtuso. Labiales breves.

Labium bilobum, lobis cylindricis hirsutis, quam in sequentibus brevioribus.

Mentum breve, semicirculare, planum, margine antico integro recto.

Corpus depressum, lateribus subrotundatis. Caput latitudine fere thoracis. Thorax vix canaliculatus. Scutellum trigonum, postice fere rotundatum.

OBS. Weberi *Lucanus lunatus, piceus,* &c. huic generi associandi?

SPEC. 1. *Dorcus parallelipipedus.*

D. niger haud nitidus, mandibulis longitudine capitis: dente medio elevato, labro late truncato, thorace lateribus rectis, superficie totâ subtilissime punctatâ.

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* Optimè dixit cel. Latreille, art. *Ocydrome, Nouveau Dict. d'Hist. Nat.* tom. xxiii. p. 129. "Je remarque que plusieurs naturalistes s'empressent, comme par une anticipation titulaire, de donner des noms à quelques coupes, qui leur paroissent devoir former de nouveaux genres, sans se donner la peine d'en établir les caractères. Ce ne sont que de simples indications, *et qui n'imposent aucune loi.*"

[*] Lucanus parallelipipedus. *Fab. Syst. Eleuth.* ii. 251. 16.
Lucanus parallelipipedus. *Panz. Fn.* f. 19.

Spec. 2. *Dorcus tuberculatus.* Anne D. parallelipipedi sexus alter?

D. superne rugoso-punctatus, labro emarginato, capite bituberculato.

Dorcus tuberculatus. *In Specierum Germanicarum Catalogis.*
Lucanus parallelipipedus. *Oliv.* i. 17. 11. tab. iv. fig. 9.
Idem. *Lat. Nouveau Dict. d'Hist. Nat.* xviii. p. 225.
Lucanus Capra. *Panzer Fn.* lviii. f. 12.

Obs. Hanc speciem, quæ Germanis videtur distinctissima, præcedentis marem Olivierius cum Geoffroyo et feminam Latreillius cum Bergstraesser putavere. At aliàs distribuuntur hæc insecta a Gyllenhallo et Panzero. "Mirum certe videtur," ait Gyllenhallus, "discrepantias tanti momenti solummodo sexui diverso tribuendas esse; anne potius species distincta? Dom. Panzer loc. cit. contendit alterum sexum Luc. Capræ tuberculis frontis destitutum esse, sed figuram clypei non memorat, nec talem vidi, quare certius dijudicare nequeo."—*Entomologia Britannica*, p. 49, etiam consulenda.

XII. *Genus.* Ægus.

Lucanus, *Fab.*

Antennæ clavâ fere perfoliatâ, vix quadrilamellatâ, articulo ultimo majore semicirculari.

Labrum haud distinctum.

Mandibulæ porrectæ, falcatæ, inermes.

Maxillæ processu apicali sub mento latitante.

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[*] Insectorum synonyma frequentiorum quæ pauca necessaria mihi visa sunt solum retuli, et omnia quidem præter ea quæ ad observationes jam scriptas exponendas utilia judicaverim sedulo omisi. In hoc opere non species determinandas, sed ordinem naturalem elaborandum esse, satis patebit.

Palpi Maxillares breves, articulo ultimo ultra mentum solo apparente.

Mentum transverso-quadratum, antice emarginatum

Corpus depressum antecedentis illi generis simillimum. Clypeus emarginatus vel potius 2-dentatus. Scutellum minutum. Tibiæ quadridentatæ.

Obs. Genus sequenti nimis affine; at palpis brevibus et clavâ antennarum perfoliatâ nihilominus distinctum.

Spec. 1. *Ægus chelifer.*

Æ. ater nitidus, capite thoraceque punctatis, elytris striato-punctatis.

Habitat in Australasiâ.

Mus. D. MacLeay.

Obs. *Lucanum cancroidem* Fabricii haud examinavi, at generi Dorco potius pertinere videtur.

Spec. 2. *Ægus interruptus.*

Æ. atro-ferrugineus, capite thoraceque punctatis, elytris lateribus punctatis ad suturam utrinque striis tribus impressis: duabus aliis interruptis.

Habitat in India?

Mus. D. MacLeay.

Spec. 3. *Ægus obscurus.*

Æ. obscurè ferrugineus, capite thoraceque punctatis, elytris striatis.

Mus. D. MacLeay.

Obs. Mandibulæ breves; sed feminæ forsan characterem efforment. Hæc species a *Lucani punctati* apud Fabricium descriptione colore ferrugineo solum differt, et illius mera forsan varietas haberi debet.

Spec. 4. *Ægus inermis.*

Æ. niger, capitis thoracisque lateribus punctatis, dorso lævi nitido, elytris subpunctatis.

Lucanus inermis. *Fab. Syst. Eleuth.* ii. 251.

Habitat in Sumatrâ.

Obs. Hanc speciem hactenus mihi non visam, ab aliis distinctam propter Fabricii descriptionem habeo.

XIII. *Genus.* LUCANUS, *Scopoli.*

Lucanus *Auctorum.*

Antennæ clavâ neutiquam perfoliatâ, at pectinatâ, trilamellatâ vel quadrilamellatâ, articulis subæqualibus.

Labrum haud distinctum.

Mandibulæ in masculis maximæ, glabræ, cornua referentes vel intus dentatæ.

Maxillæ medio unidentatæ, processu apicali, elongato, longissimo, exserto, cylindrico, setoso.

Palpi Maxillares elongati, graciles, filiformes, articulo secundo aliis conjunctim longiore. Labiales breves, articulis subæqualibus.

Labium bifidum, penicillis elongatis, setosis, exsertis.

Mentum latum, transversum.

Corpus subdepressum formâ irregulari. Scutellum distinctum rotundatum.

Genus ad interim sic dividatur.

A. Antennarum clavâ trilamellatâ.

Spec. 1. *Lucanus femoratus.* Oliv.

B. Antennarum clavâ quadrilamellatâ.

* Thorax corpore angustior.

Spec. 2. *Lucanus Cervus.* Lin.

** Thorax corpore latior.

Spec. 3. *Lucanus Alces.* Oliv.

Obs. Entomologis reverâ nodus Gordianus; sexus enim unus et alter ejusdem speciei figurâ et habitu externis, instrumentisque cibariis quam specierum diversarum duo mares vel duæ feminæ inter se longiùs sæpissime dissident. Labri etiam quod insuper Rectoceris haud raro cum clypeo connatum est, structura semper attentione digna, in Lucanis veris alteram difficultatem præbeat. Aliqui tamen in sexuali diagnosi[*], labrique structurâ, characteres forsan lateant, quibus, ut opinor, ante omnes alios ad ordinem naturalem elaborandum quasi idoneis fides daretur. His autem malè intellectis, vix etiam adhuc investigatis, ut de Rectocerorum speciebus segregandis quibusdam in Entomologiâ doctis scrupulus olim injectus fuerit, sic alios et tyrones nodi inter Lucanidas toties solvendi hujus generis, posthac certè dividendi, à studio nunc omnino deterreant. Nos igitur quodammodo oportuerit transitum ab Ægo per hoc genus ad Ceruchum et Lamprimidas facilem ut suprà demonstrare; et quamvis characteres sic evoluti artificiales, nexus ipsi profecto naturales esse sentiantur.

XIV. *Genus.* CERUCHUS.

PLATYCERUS, *Geoff. Lat. Gyllen.* LUCANUS, *Linn. Degeer. Fab. Oliv. Panz. Payk.*

Antennæ capitis longitudine, capitulo trilamellato, pectinato.

Labrum parvum, membranaceum, integrum, sub clypei acumine reconditum.

Mandibulæ porrectæ, validæ, intus dentatæ, hirsutæ.

Maxillæ processu terminali brevi, penicilliformi, intus laciniâ breviori setosâ auctæ.

Palpi mandibulis breviores; articulis elongatis, gracilibus.

Labium integrum, apice ciliatum, laciniis obsoletis.

Mentum corneum, pentagonum, concavum.

Corpus elongatum subdepressum, abdomine elytris obvoluto. Scutellum breve, triangulare. Tibiæ anticæ multidentatæ. Tarsi appendice setosâ, bifurcatâ, sub unguium origine insertâ.

SPEC. 1. *Ceruchus tenebrioides.*

C. suprà ater nitidus umbilicato-punctatus, antennis palpis-que rufis, elytris substriatis, corpore infrà fusco, pedibus nigris: tarsis paulo dilutioribus.

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[*] Lichtenstein, *Trans. Linn. Soc.* vol. vi. p. 35.

Platycerus tenebrioides. *Lat. Gen. Ins. et Crust.* vol. ii. 133.

Platycerus tenebroides. *Gyllen. Ins. Suec.* vol. i. p. 68.

Lucanus tenebroides. *Fab. Syst. Eleuth.* ii. 252. 21.

MAS. Caput magnum, thorace latius, mandibulis capite longioribus, arcuatis, in medio dente magno armatis, thorace brevi, transverso, ante medium foveolâ rotundâ utrinque impresso.

FEMINA magis obscura, crebriùs et profundiùs punctata, capite angustiori, mandibulis minoribus, thorace longiore rugâ transversâ in medio elevatâ.

β. Var. tota pallida rufescens, e nymphâ nuper deprompta.

Habitat in Europæ borealis truncis putridis, pini præsertim.

Mus. D. MacLeay.

OBS. Hujus generis, quod ad constituendum præclaræ Gyllenhalli descriptioni gratias habeam, Pholidotus necnon alia Lamprimidarum genera ad calcem recurrunt.

XV. *Genus.* PLATYCERUS, *Geoffroy.*

PLATYCERUS, *Lat. Gyllen.* LUCANUS, *Linn. Fab. Payk. Panz. Degeer. Oliv*

Antennæ capite multo longiores, capitulo quadrilamellato.

Mandibulæ validæ, lunatæ, haud valde porrectæ, intus obtusè dentatæ, glabræ.

Palpi articulis brevibus, subovatis; Maxillares mandibularum fere longitudine.

Mentum semicirculare, planum.

Corpus depressum Trogositæ staturâ. Caput thorace transverso angustius. Scutellum breve rotundatum. Tibiæ anticæ bidentatæ.

OBS. Genus adhuc examinandum.

SPEC. 1 *Platycerus caraboides*

P. cæruleus aut virescens punctulatus, subtus obscurior fere nigricans, elytris punctato-striatis tarsisque rufescentibus.

Platycerus caraboides. *Lat. Gen. Ins. et Crust.* vol. ii. p. 134.

——————— *Gyll. Ins. Suec.* i. 70.

Lucanus caraboides. *Fab. Syst. Eleuth.* ii. 253. 23. &c. &c

β. Var. pectore abdomine pedibusque rufis, ore piceo.

Platycerus rufipes. *Gyllen. Ins. Suec.* i. 70.

Lucanus caraboides. (var.) *Illig. Mag.* iv. 104. 24.

Lucanus rufipes. *Fab. Syst. Eleuth.* ii. 253.

——————— *Herbst Col.* iii. 311. 11. *Fab.* 34. f. 8.

——————— *Panz. Fn.* 58. f. 14.

γ. Var. supra tota chalybea.

Platycerus chalybeus *Germanorum.*

δ. Var. tarsis nigris.

Platycerus nigripes *Germanorum.*

Habitat in Europæ sylvis.

Mus. D. MacLeay.

OBS. Antennarum articulis extimis majoribus et uno latere productis, labro parvo, mandibulâ exsertâ, palpis maxillaribus subfiliformibus, articulo ultimo longiore ovato cylindrico, maxillæ laciniis duabus, quarum apicali elongatâ compressâ, intus et ad apicem pilis ciliatâ, ut et corpore depresso virescenti, ad Platyceros accedit Fabricii genus Trogosita.—Imò verò *Trogositam Mauritanicam* insectum pentamerum esse notatu dignum sit, cujus tarsorum articulus primus ut sæpe in Rectoceris Thalerophagis parvus retractus videatur. Hanc ideo Trogositam inter Lucanoides suos optimè posuit acutissimus Gyllenhallus, genus enim reverâ distinctum, forsan osculans eam constituturam suspicor.

XVI. *Genus.* SINODENDRON, *Fabricius.*

SCARABÆUS, *Linn.* LUCANUS, *Kirby.*

Antennæ omnino ut in Cerucho.

Labrum exsertum, coriaceum, antice convexum.

Mandibulæ breves, corneæ, validæ, sub clypeo reconditæ.

Maxillæ processu duplici; apicali membranaceo ciliato, interno dentiformi.

Palpi Maxillares articulo secundo elongato, conico, subarcuato, tertio brevi, terminali ovato apice obtuso. Labiales articulo ultimo crassissimo, aliorum conjunctim longitudine.

Mentum angustatum, integrum, valde retusum, labio brevi conico, carinato.

Corpus convexum, cylindricum, ano obvoluto. Scutellum parvum, obtusum.

SPEC. 1. *Sinodendron cylindricum.*

S. nigrum profunde impresso-punctatum cicatriculosum: punctis umbilicatis: umbilico perforato.

Sinodendron cylindricum. *Lat. Gen. Ins. et Crust.* tom. ii. p. 101.

MAS. Capitis cornu recurvo, posticè fulvo hirto, thorace anticè truncato quinquedentato.

FEMINA. Capitis cornu brevi recto, thorace antice vix retuso.

Habitat in Europæ ligno putrido.

OBS. Insectum prorsus singulare, cujus cum Orycte affinitas a Cel. Latreillio pulcherrimè exponitur *Gen. Ins. et Crust.* vol. ii. p. 100. A Rectoceris labro mento mandibulis thorace corporisque staturâ differt. Genera ità anomala quæ aliis semper adhuc difficultates objecerint, structurâ penitus spectatâ, opinionem nostram confirmare potius quam labefactare videantur.

Rectocerorum omnia Thalerophagorum genera quæ ad manus mihi fuere jam recensui; et ordinis hiatus naturalis quos exposuerim, his insectis per orbem perparcè diffusis adeoque in musæis rarissime inventis, mihi tam suppletu difficiles fuisse vix Entomologo mirum erit.

II. PETALOCERA.

Antennæ rectæ, capitulo flabellato. *Mandibulæ* clypeo plerumque obtectæ vel raro exsertæ.

Obs. A Lamprimidarum familiâ per *Lethrum cephalotem* inter Geotrupidas transducimur.—Hiatus autem adeo perspicuus est quo Lethrus a Rectoceris sejungitur ut vix lateat entomologum neque ullo discrimine egeat apertiori.

A. *SAPROPHAGA.*

Pedes validi (posticis ab aliis subremotis); tibiæ latæ, ac elytra sæpius ad anum pertingentia.

Fam. GEOTRUPIDÆ.

Genus. Orphnus.

Geotrupes, *Fab.*

Antennæ decem-articulatæ, basilari magno, vix elongato, conico; secundo subgloboso; tertio, quarto, quinto, sexto et septimo brevissimis, transversis; ultimis paulo sensim latioribus, capitulo lamellato plicatili, subgloboso.

Labrum clypeo fere occultatum, margine antico solum exserto.

Mandibulæ exsertæ, arcuatæ, subtrigonæ, basi crassæ, extus rotundatæ, apice acutæ, intus unidentatæ.

Maxillæ inermes, processu unico crustaceo, triquetro-trigono, sed laciniæ apicalis loco fasciculo ciliato, extus arcuato, ciliis spinosulis.

Palpi Labiales articulo ultimo majore, subovato.

Mentum subquadratum apice truncato.

Clypeus in masculis unicornis. Corpus ovatum. Thorax antice truncatus aut excavatus, coleoptris abdomen posticè non obtegentibus. Tibiæ anticæ extus tridentatæ; aliæ lineis transversis ciliatæ.

Spec. *Orphnus bicolor.*

O. supra niger subtus brunneus, thorace retuso bidentato:

lateribus punctatis, capitis cornu brevi erecto plano, elytris vix striatis.

Geotrupes bicolor. *Fab. Syst. Eleuth.* vol. i. p. 9. n. 27.

Habitat in Indiâ. Mus. D. MacLeay.

Obs. Orycti genus simillimum, ab illo enim antennarum capitulo subgloboso, labro exserto, maxillarum processu apicali ac mento breviore tantùm differt.

Genus. HYBOSORUS.

SCARABÆUS, *Fab.* GEOTRUPES, *Fab.*

Antennæ decem-articulatæ, articulo basilari magno, crasso, piloso; secundo subgloboso vel conico; quinque proximis pateræformibus; octavo infundibuliformi duos ultimos excipiente et clavam ita rotundatam subconicam formante.

Labrum exsertum, crustaceum, antice valde convexum.

Mandibulæ validæ, exsertæ, falcatæ, vel valde arcuatæ, apice acutæ, haud dentatæ.

Maxillæ laciniâ apicali acutâ, cultelliformi, membranaceâ, compressâ, fimbriatâ, internâ subcrustaceâ intus ad apicem unidentatâ.

Palpi Maxillares articulo basilari incurvo, minutissimo, piloso; secundo oblongo conico; tertio brevi conico; ultimo elongato-cylindrico apice subacutiori. Labiales articulo ultimo fere aliis conjunctim longiore.

Mentum oblongo-quadratum, lateribus convexis, margine antico emarginato, ligulâ vix distinctâ.

Corpus ovatum, convexum; capite semicirculari; scutello distincto, elytris abdomen obtegentibus, tibiis anticis extus tridentatis.

Obs. Genus quidem Orphno proximum, sed Ægialiæ maxillas palpos et mentum habens!—Dispositionem adeo circularem tam inter Petalocera Saprophaga maxillis membranaceis quam inter illa etiam corneis indicari, nobis incidit suspicio. Et cum porro talis quidem inter Thalerophaga ordo nequaquam difficillime distinguendus est, iis qui amovere vela quibus systema naturale obtenditur cupiant conjecturæ hujus verisimilitudo in speciebus examinandis forsan posthac apparebit, etsi nullis adhuc certis rationibus niti ducatur.

SPEC. *Hybosorus Arator.*

H. ater, thorace lævi, elytris striato-punctatis.

Scar. Arator. *Fab. Ent. Syst.* vol. i. p. 33. n. 106.

Geotrupes Arator. *Fab. Syst. Eleuth.* vol. i. p. 91. n. 75.

Habitat in Hispaniâ, a D° Dejean ibi lectus. Apud Fabricium Caput Bonæ Spei locus Hybosori naturalis est, at Clar. viri sententiam in suspicionem vocare vellem; sex enim species in Mus. MacLeayano asservatæ Europæ meridionali, Africæ boreali ac Indiæ orientali sunt propriæ.

Genus. ELEPHASTOMUS.*

SCARABÆUS, *Schreibers.*

Antennæ undecim-articulatæ, articulo basilari conico, parum elongato, pilis longissimis instructo; articulo secundo breviori, crasso, subconico, sex proximis brevissimis, pateriformibus; articulo nono et undecimo hemisphæricis, medium omnino fere absconditum intercludentibus, clavam magnam oblatam subsphæroidem ita formantibus.

Labrum lateribus rotundatis transversum, sublineare, et clypei ad superficiem perpendiculare.

Mandibulæ triquetro-trigonæ, falciformes, apice intus bidentatæ, margine interno submembranaceo.

Maxillæ corneæ, arcuatæ, intus dente acuto et ad apicem laciniâ obtusâ ciliis spinosulis armatæ.

Palpi Maxillares longissimæ, labialibus fere triplo longiores, articulo basilari minutissimo, subgloboso; secundo longissimo, cylindrico, arcuato, apice obtusiori; tertio breviori, conico, apice crassiore; ultimo longitudine secundum fere æquante, cylindrico, elongato, lanceolato, apice graciliore. Labiales articulo basilari minutissimo subgloboso; secundo sub-cylindrico arcuato; ultimo eâdem longitudine, sub-semicirculari, sub-cylindrico.

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* Propriè *Elephantostomus*—nomen ob euphoniam curtatum.

Mentum lateribus angustatis, brevissimum, verticaliter deflexum, et apice profunde emarginatum aut potius bilobum, lobis rotundatis.

Labium fere nullum.

Clypeus thorace multo angustior, posticè ad utrumque latus in lobum ocularem dilatatus, anticè in medio extensus, et in laminam subquadratam versus apicem sub-emarginatam, solidam imperforatam productus. Rostri hujus apex crassior, furcatus; furcis lateralibus deorsum spectantibus. Os sub clypeo totum latitans, instrumentis cibariis verticaliter deflexis structuram in hac familiâ anomalam formantibus. Corpus subtus undique hirtum, valde convexum; thorace subretuso, inermi, elytris totum corpus ambientibus. Scutellum magnum, triangulare, planum. Pedes hirti, femoribus anticis et posticis incrassatis; tibiis anticis extrorsum sex-dentatis; tibiis mediis et posticis triquetris.

SPEC. 1. *Elephastomus proboscideus.*

E. ferrugineo-nigricans, clypei cornu brevi erecto obtuso emarginato, antennis ferrugineis, thorace mutico subretuso ad latera punctis impresso, elytris punctato-striatis.

MAS processu rostriformi gracili, longitudine totius clypei et subtus capitis laminâ in medium elevatâ paululum supra os fulcro verticali apice furcato munitâ.

FEMINA capitis cornu quam in mare subobtusiori, rostro multo breviore latiore; clypeo subtus in medium elevato sed fulcro verticali haud instructo.

Scarabæus proboscideus. *Schreib., Trans. Linn. Soc.* vol. vi. p. 189.

β. Var. rufescens e nymphâ nuper deprompta.

Habitat in Nova Hollandiâ. Mus. D. MacLeay.

Genus. ATHYREUS.

SCARABÆUS, *Fab.? Gmel.?* COPRIS, *Fab.?*

Antennæ fere omnino ut in Elephastomo, nisi clavæ margine rotundiori.

Labrum latum, transverso-quadratum, anticè vix trilobum, lobis rotundatis.

Mandibulæ corneæ, validæ, triquetro-trigonæ, subarcuatæ, superne planæ, extus bidentatæ, apice interno pariter bidentato margineque interno membranaceo.

Maxillæ laciniâ apicali subcrustaceâ, triangulari, dilatatâ, margine antico ciliato, spinosulo; laciniâ internâ processubus duobus munitâ, hoc spiniformi et illo dilatato, spinosulo.

Palpi articulo labialium ultimo maxillarium illum fere longitudine æquante.

Mentum subquadratum, profunde emarginatum, lateribus sinuatis, postice convexis, tum angustatis, et in lobum utrinque desinentibus.

Labium bifidum, laciniis ciliatis.

Clypeus thorace multo angustior, posticè ad utrumque latus in lobum ocularem acutum dilatatus, anticè in laminam subquadratam superficie inæquali prolongatus; hoc processu antico in medio elevatione tricuspidatâ instructo, cornu medio longiore, basi lineam longitudinalem distinctam vel obsoletam formante.

Corpus valde convexum, subtus hirsutum, thorace antice mucronato postice lobato Scutellum lineare, inter elytra productum haud distinctum. Pectus magnum, pedum secundum par alterum ab altero late separans.

OBS. Genus admodum singulare capite neglecto a Copride haud distinguendum; sed ab Elephastomo quoque haud longe distat. Insecti mihi non adhuc visi descriptione apud Fabricium recensitâ, *Copris Æson* (vel *Scar. Boas Ent. Syst.* 149. 160.) huic generi appropinquare videtur.

SPEC. 1. *Athyreus bifurcatus.*

Niger punctis elevatis scaber, thorace antice mucronato: dente elevato lato bifurcato, elytris striis elevatis glabris minutis: suturâ hirsutâ ferrugineâ.

Habitat in Braziliâ.

Mus. D. MacLeay.

SPEC. 2. *Athyreus tridentatus.*

A. ferrugineus scabriusculus, thorace in medio excavato glabro tridentato: dente apicali longiore, aliis lateralibus obtusioribus, elytris vix striatis.

Habitat in Braziliâ.

Mus. D. MacLeay.

SPEC. 3. *Athyreus bidentatus.*

A. ater scabriusculus, thorace in medio excavato glabro bidentato: dentibus lateralibus obtusiusculis, elytris obsolete striatis.

Habitat in Braziliâ.

Mus. D. MacLeay.

OBS. *A. bifurcato* scutellum vix distinctum, et tibiæ anticæ quinquedentatæ sunt, dum clypei cornu medium basi lineam distinctam longitudinalem efformat; speciebus autem duabus aliis scutellum indistinctum, tibiæ quadridentatæ, et clypei obsoleta est linea longitudinalis.

Fam. SCARABÆIDÆ.

Circulo naturali, quem inter Scarabæidas efformant Coprides Americanæ pedum unguibus nullis *floriger, splendidulus, Carnifex, conspicillatus, festivus, Mimas, Faunus, Belzebul, Jasius, Lancifer* ac aliæ ineditæ, accedit Athyreus.

Genus. PHANÆUS.

SCARABÆUS, *Linn. Oliv. Degeer.* COPRIS, ONITIS, *Fab.*

Antennæ novem-articulatæ, articulo secundo brevi, pateriformi vel semicirculari, tertio, quarto, et quinto longioribus, sexto breviori; clavâ infundibuliformi, articulo primo subtrigono secundum et tertium excipiente, margine externo subemarginato; articuli secundi margine interno ferri equini instar ferente; articulo ultimo operculiformi margine externo emarginato.

Instrumentis in Cibariis haud valida patet distinctio. Hæc enim Insecta Coprophaga sunt, et in Mundo Novo Onitis generis officiis fungantur. Vide *Oliv. Ent.* t. vii. f. 50. a— ubi palporum labialium articulus basilaris notatu dignus sit.

Caput subtrigonum, sæpissime cornutum, clypeo sæpius bidentato vel emarginato. Thorax puncto utrinque impressus, abdomine antice sæpius latior, lateribus sinuatis marginatis, margine postico punctis sæpius duobus impressis, lineâ utrinque elevatâ rarius obsoletâ. Pectus planum, sæpius canaliculatum, sterno acuto vel carinato. Pedes validi; Tibiæ anticæ tri- vel quadri-dentatæ, tarsis obsoletis, sed spinâ articulatâ ad apicem. Tibiæ posticæ conicæ, tarsis gracillimis, unguibus nullis.

Obs. Color metallicus vel nigro-lucidus nunquam obscurus. Elytra sulcata vel striata.

Hoc in circulo quinque formæ Typi sunt notandi.

TYPUS 1. Clypeus antice bidentatus. Thorax margine postico vix acuminato, punctis duobus impressis. Pectus haud longius quam latius, canaliculatum, antice carinatum. Tibiæ extus quadridentatæ dentibus subacutis.

Spec. 1. *Phanæus bellicosus.*

P. nigro-violaceus, subtus niger, thorace antice excavato, lineis utrinque duabus elevatis, elytrorum striis vittæformibus.

Mas. Capitis cornu longo recurvo; in medio thoracis postico cornubus duobus compressis, erectis, brevibus, bidentatis, fossulâque inter cornua magnâ impressâ.

Scarabæus bellicosus. *Oliv. Ent.* i. 3. p. 103. n. 118. t. 22. f. 32.

Copris bellicosa. *Schönherr Syn. Ins.* i. p. 44. (*rectè, at Fabricii error animo invito retinendus*).

FEMINA? Capitis cornu brevissimo erecto, utrinque unidentato, thorace prominentiâ triplici: intermediâ latâ transversâ supra canaliculatâ, tuberculo acuto utrinque munitâ.

Mus. D. MacLeay.

Habitat in Brasilia.

OBS. 1. Huic *Copris lancifer* Fab. *Scarabæus Jasius* Oliv. et *Onitis Jasius* Fab. associandi.

OBS. 2. Recte observat Schönnherrius cum Illigero, vol. i. p. 31, quod *Scarabæus Jasius* Oliv. et *Onitis Jasius* Fab. species distinctæ sint putandæ; at quoniam prorsus affines sunt, in errorem levem lapsus est ipse Insectorum Synonymiæ celeberrimus auctor, qui speciem unam Oniti et alteram Copridi attribuit. Ut confusio demum evanescat, has species distinguam.

SPEC. 2. *Phanæus Jasius.*

P. nigro-viridis, capitis cornu breviusculo suberecto: lateribus unidentatis, thorace punctato rugoso excavato anticè retuso posticè longitudinaliter canaliculato, femoribus viridibus.

MAS? Capitis cornu reflexum, subacutum: parte stipitali longiore, thorace anticè excavato, suprà tridentato: dentibus minutis, æqualibus, acutis.

β. Var. Thorax nigrior, suprà glabriusculus, vix longitudinaliter canaliculatus; dente intermedio majore.

FEMINA. Capitis cornu transversum, brevissimum: dentibus utrinque obsoletis, thorace medio excavato: processu antico transversali, truncato, lineari.

Scarabæus Jasius. *Oliv. Ins.* 3. 109. 126. t. 7. f. 50.

Copris Jasius. *Illig. Mag.* iii. p. 148.

Habitat in Demerarâ, Cayennâ.

Mus. D. MacLeay.

SPEC. 3. *Phanæus Dardanus.*

P. nigro-viridis, capitis cornubus duobus brevibus basi connatis, thorace antice carinâ bidentatâ instructo.

Onitis Jasius. *Fab. Syst. Eleuth.* 1. p. 28. n. 8.

MAS. Thorax fossulâ utrinque sub carinæ dentibus unidentatâ; his subacutis lineâ transversâ sinuatâ elevatâ postice conjunctis.

FEMINA? Mare minor. Thorax fossulâ utrinque haud profundâ vix unidentatâ, carinæ dentibus obtusis, lineâ elevatâ minus distinctâ.

Mus. D. MacLeay.

Hæc species, quæ capitis cornu et thorace bidentato *Copridi Mimanti* Fab. propinquat, e Braziliâ nobis est allata.

OBS. 3. Insecta alia duo quæ speciebus et sexubus diversis attribuenda sint, vix pro *P. Jasii* varietatibus habenda, Entomologis adhuc proponam.

Phanæus Abas?

MAS niger vix viridis. Capitis cornu longiusculum, paulo recurvum lateribus unidentatum: parte stipitali breviore, thorace excavato, suprà glabriusculo, prominentiâ triplici: intermediâ latâ truncatâ canaliculatâ, aliis dentiformibus, pedibus nigris.

Habitat in Insulâ Trinidad. Mus. D. MacLeay.

Phanæus Acrisius?

FEMINA nigra vix viridis. Capitis cornu transversum, lineare, dentibus utrinque nullis, thorace excavato, suprà prominentiâ utrinque vix elevatâ, glabriusculo; subtùs processu antico transversali semicirculari munito.

Habitat in Braziliâ.

Mus. D. MacLeay.

TYPUS 2. Clypeus antice sub-bidentatus. Thorax margine postico acuminato, punctis duobus impressis. Pectus fere duplo longius quam latius, canaliculatum, anticè carinatum. Tibiæ extùs tridentatæ dentibus obtusis.

SPEC. 4. *Phanæus Mimas.*

P. niger et viridi-aureus, capite obsolete bicorni, thorace inermi retuso angulato, elytris inauratis.

Scarabæus Mimas. *Linn. Syst. Nat.* p. 545. n. 17.

——————— *Oliv. Ent.* 1. 3. p. 108. n. 125. t. 7. f. 50.

Copris Mimas. *Fab. Syst. Eleuth.* 1. p. 45. n. 68.

Mas Capite lineâ transversâ elevatâ cornubusque duobus brevibus, basi connatis; thorace anticè valde elevatiore, angulis subporrectis.

Femina mutica, capite lineis duabus transversis elevatis, thoraceque lineâ aliâ transversâ semicirculari elevatâ anticè instructo.

Mus. D. MacLeay.

Habitat in Americâ Meridionali.

Obs. 4. *Copridem Mimantem* forte ad Onitis genus amandandam esse suspicatus est cel. Fabricius, at affinitas illa Phanæi circuli omnis pro charactere est habenda.

Obs. 5. *Phanæo Mimanti Copris Faunus* Fab. *Belzebul* Fab. et *Scarabæus Belzebul* Oliv. adhuc associandi.

Obs. 6. Si in *Copridis Jasii* descriptione hallucinatus sit Fabricius, errorem similem cel. Olivier haud equidem vitavit. Mas enim sui *Scarabæi Belzebul* a Fabricii *Copride Belzebul* differt, et species sic distinguantur.

Spec. 5. *Phanæus Belzebul.*

P. niger, capitis cornu brevi haud recurvo: basi corniculo utrinque armatâ, thorace punctato-rugoso prominentiâ triplici: intermediâ multo latiore, elytrorum striis versus apicem subobsoletis.

Scarabæus sulcatus. *Drury Ill.* 1. t. 35. f. 1.

Scarabæus Belzebul. *Fab. S. Ent.* p. 23. n. 88.

——————— *Fab. Ent. Syst.* 1. p. 46. n. 152.

Scarabæus Belzebul femina. *Oliv. Ent.* 1. 3. 107. 124. t. 14. f. 136.

Copris Belzebul. *Fab. Syst. Eleuth.* 1. p. 37. n. 32.

Mas. Capitis cornu erectum, corniculis ad basin distinctis, thorace antice sub prominentiâ intermediâ excavato, corniculis utrinque acutis.

Femina capitis cornu brevissimo subprostrato: corniculis ad basin obsoletis, thorace antice truncato; corniculis utrinque subobtusis.

Habitat in Insulâ Jamaicensi.

Mus. D. MacLeay.

Obs. 7. Speciem semper icone determinari apud Druræum oportet: descriptiones enim ejus plerumque nihili sunt, tabulæ autem accuratissimæ.

Obs. 8. *P. Belzebul* sectioni præcedenti inter Phanæum quem (*Abantem* mihi) ex insulâ Trinitatis descripsi et *P. Dardanum* propinquat: hujus enim thoracem, illius autem capitis cornu ad basin unidentatum habet.

Spec. 6. *Phanæus Moloch.*

P. niger, capitis cornu basi tuberculo utrinque inconspicuo, thorace glaberrimo antice retuso spinoso: partis superioris in medio lineâ longitudinali impressâ, fossulâque cornu externum a duobus aliis lateralibus utrinque dividente, elytrorum striis latis haud profundis.

Mas? Capitis cornu longum recurvum. Thorax corniculis septem, septimo transverso, apice emarginato, in medio thoracis lineæ longitudinalis ad originem protenso.

Femina. Capitis cornu brevius vix recurvum. Thorax tuberculis sex fere æqualibus, subacutis, septimo medio emarginato nullo.

Scarabæus Belzebul mas. *Oliv. Ent.* 1 3. 107. 124. t. 14. f. 136. a.

Copris Belzebul. *Schönnheri Syn. Ins.*

Habitat in Braziliâ vel Insulâ Jamaicensi?

Mus. D. MacLeay.

TYPUS 3. Clypeus antice emarginatus. Thorax margine postico acuto, lobo parvo punctisque duobus obsoletis vel vix conspicuis. Pectus paulo longius quam latius, antice acutum haud canaliculatum, at puncto longitudinali posticè impressum. Tibiæ extùs tridentatæ dentibus acutis.

SPEC. 7. *Phanæus Columbi.*

P. nigro-virescens nitidus subtus niger, capitis cornu vix recurvo, clypeo antice nigro subtilissimè rugoso ante oculos virescente, thorace punctato-rugoso antice retuso, canali profundo utrinque impresso, medio supero vix canaliculato, elytrorum sulcis haud profundis.

MAS? Capitis cornu apice emarginatum. Thorax prominentiâ inter fossulas laterales quadrispinosâ, spinis externis majoribus.

Mus. D. MacLeay.

Sexus alter adhuc latet.

Habitat in Braziliâ.

OBS. 9. Insectum *Phanæo Columbi* affinitate proximum, quod ab illo capitis cornu apice simplici, thorace antice bispinoso et lineâ utrinque elevatâ ad angulos porrectâ subcorniculatâ solum differt, in Musæo MacLeayano hospitatur.—An sexus alter?

OBS. 10. In *Phanæi Columbi* tibiis anticis sub spinâ ad apicem articulatâ tarsorum rudimentum latitans, singulare, minimum, vix conspicuum, articulatum, et ad apicem ciliis duabus gracillimis longissimis instructum detexi.

TYPUS 4. Clypeus antice subemarginatus. Thorax margine postico acuto, lobo magno, punctis duobus posticis omnino deperditis. Pectus haud vel vix canaliculatum in sternum acutum recurvum inter pedes productum. Tibiæ anticæ extus tridentatæ, dentibus apicalibus acutis, altero obtuso vel subobsoleto.

MAS cornutus.

FEMINA mutica.

SPEC. 8. *Phanæus festivus.*

P. rubro-æneus, thorace glaberrimo anticè prominente.

Scarabæus festivus. *Oliv. Ins.* 1. 3. 110. 127. tab. 3. fig. 21.

Copris festivus. *Fab. Syst. Eleuth.* 1. p. 32. 5. 10.

MAS capitis cornu erecto ad planum dorsi pertingente, thorace bicorni, medio inter cornua compressa nigra intus recurva elevato, subcanaliculato, antice haud excavato.

FEMINA capite lineâ transversâ elevatâ, thorace mutico nigro maculato antice prominentiâ triplici; intermediâ latiore, lineâ transversâ elevatâ angulum ad apicem formante.

Scarabæus festivus. *Linn. Syst. Nat.* 2. 552. 52.

Mus. D. MacLeay.

Habitat in Americâ meridionali.

OBS. 11. In hujus insecti feminâ tarsorum anticorum rudimentum iterum detexi.

OBS. 12. *P. festivi* apud Linnæum, Fabricium, Olivierum ac alios character specificus malè depromptus est, hæc enim species adeò facillime cum duabus sequentibus concoloribus erat confundenda.

SPEC. 9. *Phanæus hilaris.*

P. rubro-æneus thorace glaberrimo, antice excavato.

MAS capitis cornu erecto ad dorsi planum haud pertingente, thorace bicorni, medio inter cornua compressa nigra maculâ nigrâ conjuncta haud intùs curvata, antice excavato.

FEMINA capite lineâ transversâ bituberculatâ instructo; thorace antice excavato bimaculato, maculis nigris.

Mus. D. MacLeay.

Habitat in Demerarâ.

SPEC. 10. *Phanæus lautus.*

P. rubro-cupreus, thorace antice punctato prominente.

MAS capitis cornu recurvo, thorace retuso nigro maculato antice prominentiâ triplici, intermediâ latiore lineâ transversâ elevata semicirculari ad apicem instructâ.

Femina capite bituberculato, thorace nigro maculato antice prominentiâ quadruplici instructo intermediis acutioribus.

Mus. D. MacLeay.

Habitat in Braziliâ.

Obs. 13. *Phanæi lauti* mas, nisi thorace antice punctato, capite cornuto et colore rubro-cupreo a *Phanæi festivi* feminâ vix differt.

Obs. 14. Ad *Phanæos festivum, hilarem* et *lautum, conspicillatus* Fabricii et Humboldtii adjungendus.

TYPUS 5. Clypeus integer rotundatus. Thorax abdomine haud latior, margine postico acuto, vix lobato, punctis posticis interdum in mare vix unquam in feminâ prorsus obsoletis. Pectus canaliculatum, antice acutissimum, haud productum. Tibiæ extus tridentatæ, dentibus distinctis.

Mas cornutus.

Femina mutica.

Spec. 11. *Phanæus Carnifex.*

P. thorace cupreo-aurato: rugis distinctis elevatis; punctis posticis in mare obsoletis in feminâ distinctis, elytris viridi-æneis multipliciter striatis: rugis elevatis confluentibus inter strias scabris.

Scarabæus Carnifex. *Linn. Syst. Nat.* p. 546. no. 22.

—————— *Oliv. Ins.* 1. 3. p. 135. n. 161. p. 6. f. 46. a. 6.

—————— *Drury Ins.* 1. p. 35. f. 3—5.

Copris Carnifex. *Fab. Syst. Eleuth.* 1. p. 48. n. 84.

Mas capitis cornu longitudine thoracis incurvato acuto, thorace depresso inermi plano medio triangulari: angulis posticis productis subacutis.

Femina capitis cornu brevissimo emarginato, thorace convexo antice truncato lineâ transversâ elevatâ instructo.

β. Var. thorace viridi-æneo ac elytris violaceis.

Mus. D. MacLeay.

Habitat in Americâ septentrionali.

OBS. 15. Apud Olivierum figura 86, tab. 10, hanc ad speciem haud pertinet, at insecto *P. splendidulo* Fab. affini forsan est assimilanda.

OBS. 16. *Phanæi Carnificis* characteres ità recensui, ut varietatibus à sequentibus vix speciebus facilius dignosceretur.

Phanæus vindex?

P. thorace cupreo-aurato suprà bicorni: inter cornua lineâ elevatâ transversâ; rugis distinctis elevatis; punctis posticis in utroque sexu obsoletis, elytris viridi-æneis multipliciter striatis.

MAS capitis cornu brevissimo haud capitis longitudine acuto vix recurvo, thorace bicorni medio subexcavato: cornubus compressis obsoletis.

Scarabæus Carnifex var. *Drury Ins.* 1. p. 35. f. 4.

FEMINA capite tuberculato: tuberculo transverso, thorace supra subexcavato quadrato.

Mus. D. MacLeay.

Habitat in Americâ boreali, *P. Carnifici* nimis affinis.

Phanæus igneus?

P. thorace cupreo-aurato: rugis inconspicuis elevatis: punctis posticis in mare saltem distinctis, elytris viridi-æneis inter strias punctis impressis.

MAS capitis cornu capitis longitudine incurvato obtuso, thorace depresso plano: angulis lateralibus posticis in cornua compressa intus subcurvata productis.

Mus. D. MacLeay.

FEMINA adhuc latet.

Habitat in Georgiâ Americæ borealis.

OBS. 17. His *C. splendidulus* Fabricii ac *C. floriger* Kirbii associandi, sed a quinto formæ typo longiùs recedentes per alias species adhuc ineditas ad *P. bellicosum* Entomologum denuo reportant.

OBS. 18. Phanæus omnis his quinque typis facile referendus est; ac circulus undique connexus ita formatur quem ut suprà e triginta speciebus in musæo MacLeayano asservatis sedulo evolvi. En naturæ arboris dichotomi corpora omnia proferentis terrestria organica ex ramusculis extremis aspicias unum!

Obs. 19. Si genus Circulum undique connexum significare valeat, tum præterea si omnis divisionis generici cogitatio ex animo extirpata fuerit Phanæum pro genere aliquatenus naturali oporteat haberi. Si vero genus contrà pro divisione sit habendum, quis Phanæo terminos præscribet?

Obs. 20. *P. Carnifex* formatam e stercore pilulam conjunctis viribus per totam æstatem usque in foveam determinatam volvere ac volutare apud Linnæum dicitur; An omnium Phanæorum mores ab uno discantur?

Obs. 21. Insecta quæ Phanæi circulo proximè accedunt, formâ vero quæ distinctâ fruuntur sunt *Copris Carolinus* Fab. *C. Hesperus* Oliv. *C. Nisus* Oliv. *C. tridens* Fab. ac *Onitis Bison* Fab.

Genus. SCARABÆUS, *Linné.*

SCARABÆUS, *Linn. DeGeer. Oliv.* COPRIS, *Geoff.* ATEUCHUS, *Web. Fab. Lat.* ACTINOPHORUS, *Sturm.*

Antennæ articulis novem, articulo primo cylindrico, ad apicem et ad basin paulo crassiore, secundo subconico, tertio, quarto, quinto et sexto duobus ultimis præsertim brevibus, tertio et quarto subconicis, quinto et sexto pateræformibus, septimo, octavo et nono capitulum ovatum subcompressum transversum formantibus, septimo pateræformi alios fere includente.

Labrum subquadratum, ad apicem subacutum, angulis anticis rotundatis.

Mandibulæ ad basin tricuspidatæ, deinde in laminam vix concavam, trigonam, externe corneo-coriaceam, intus coriaceo-membranaceam productæ, latere interno et apice villis brevibus fimbriatæ.

Maxillæ laciniâ apicali multo majore subquadratâ, margine externo subarcuato fimbriato; lobo interno dentiformi acuto.

Palpi Maxillares articulo basilari minimo, secundo et tertio obconicis, secundo majore, externo ovali cylindrico longissimo, secundo fere duplo longiore. Labiales menti ad angulos superos inserti, articulo basilari subconico vix secundo majore, sed aperte longiore quam latiore, latere interno arcuato.

Labium laciniis subtrigonis.

Mentum subquadratum, lateribus convexis.

Clypeus subtrilobus, lobo medio latiore emarginato, utrinque bidentato. Corpus depressum, elytrorum margine externo post humeros nec profunde nec abrupte sinuato. Pedes villosi, tibiis anticis extus quadridentatis; posticis ad apicem oblique truncatis, inde tarsis illarum lateribus posticis insertis; tibiarum earundem ipso apice cum calcare in spinam validam producto, tarsorum dimidii ad minus longitudine.

SPEC. 1. *Scarabæus Sacer.*

S. obscuro-niger, occipite bituberculato, elytris sublævibus lineis sex impressis obsoletis.

Scarabæus Sacer. *Linn. Syst. Nat.* ed. 13. vol. i. p. ii. p. 545.

——————— *Oliv. Ent.* vol. i. no. 3. tab. 8. fig. 59.

Ateuchus Sacer. *Fab. Syst. Eleuth.* tom. i. p. 54.

——————— *Lat. Gen. Ins. et Crust.* vol. ii. p. 77.

Habitat in Europâ australiori, Africâ.

Mus. D. MacLeay.

OBS. 1. Hoc genus circuli nondum examinati partem forsan constituens, prorsus artificiale videtur, at sic fere omnia!

A Fabricii Ateuchis genera Gymnopleurum et Canthonem jamdudum separavit Cel. Illiger; illa autem insecta Coprophaga *clypeo radiato* celeberrima Scarabæi nomine sola dignatus sum. Tertiæ apud Latreillium *Gen. Crust. et Ins.* vol. 2. p. 78. sectionis Ateuchi *Pilularius* Linn., &c. nomen retineant.

Fam. APHODIIDÆ.

Locum inter Scarabæidas et Trogidas Aphodiidarum verum generum anatomiâ indicari vix opus est, Ægialiæ enim apud Latreillium (*Gen. Ins. et Crust.*) et Psammodii characteres apud Gyllenhallum consuluisse sufficiat.

Fam. TROGIDÆ.

Genus. ACANTHOCERUS.

TROX, *Fabricius.*

Antennæ decem-articulatæ, articulo basilari crasso triangulari, uno angulo antico in spinam acutam producto, altero truncato, articulum secundum parvum subconicum recipiente; capitulo ut in Troge articulis divergentibus fere pectinato.

Labrum deorsum spectans, exsertum, transverso-quadratum, margine antico vix emarginato.

Mandibulæ exsertæ, corneæ, validæ, oblongæ, crassæ, subpentagonæ, supra concavæ latere externo rotundato; apice exteriori subacuto, interiori unidentato, margine interno ciliato.

Maxillæ intus ad basin corneæ unidentatæ, laciniâ terminali membranaceâ, dilatatâ, quadratâ vel subrotundatâ, intus ciliatâ.

Palpi Maxillares articulo basilari minutissimo, secundo, tertio et quarto subconicis, hoc longissimo cylindrico apice obtuso. Labiales breves, articulis secundo et tertio subconicis.

Mentum quasi e duplici parte formatum, aliâ apicali cordatâ ad basin truncatâ, carinatâ, margine antico emarginato, lateribus rotundatis, elevatis; alterâ prioris stipite transversâ concavâ, margine antico recto, lineari.

Clypeus porrectus subquadratus, margine antico lobato, lobo subacuto. Os sub capite latitans, instrumentis cibariis verticalibus. Corpus ovatum, valde convexum, elytris abdomen globosum longe obtegentibus. Thorax lunaris, margine postico semicirculari, vel angulis posticis emarginatis. Scutellum magnum, distinctum. Pedes, postici præsertim, magni, lati, compressi, subcontractiles; tibiis extus arcuatis, basi angustioribus, fere acutis; anticis vix extus dentatis, alteris inermibus. Tarsi graciles, quatuor posticis pone tibias reflexis latitantibus.

Obs. 1. Genus antennarum formâ et habitu generali Trogidis sane affine, cum illis ergo recte ponendum. Maxillarum vero structura mandibulæque exsertæ Hybosori propinquitatem haud parvam satis demonstrant, dum clypeo instrumenta cibaria occultante et situ oris verticali Elephastomo aliquatenus quoque Acanthocerus conferatur. An subdivisio bina circularis rursus nobis in suspicionem sit adducenda? Ulterius jam progredi nequeo licet conjecturam supradictam aliquantulum confirmaverit hujus insecti singularis anatomia.

Spec. 1. *Acanthocerus æneus.*

A. æneus, antennis corporeque subtus ferrugineis, capite antice punctato postice cum thorace glaberrimo, elytris punctato-striatis: punctis elevatis rarissimis vix distinctis, pedibus obscure æneis.

Habitat in Americâ boreali.

Mus. D. MacLeay.

Obs. 2. *Trox spinicornis* Fab. Syst. Eleuth. vol. i. p. 112. huic generi associandus.

Genus. PHOBERUS.

TROX, *Fab. Oliv.*

Antennæ decem-articulatæ, articulo basilari triquetro-trigono, magno, crasso, piloso, secundo oblongo globoso, tertio conico graciliore, quarto, quinto, sexto et septimo pateræformibus.

Labrum subsemicirculare, crustaceum, antice vix emarginatum, ciliatum, lateribus rotundatis.

Mandibulæ validæ, breves, crassæ, triquetro-trigonæ, arcuatæ, inermes, apice acutissimæ.

Maxillæ hirsutæ, processu interno spinis duabus hirsutis elongatis, intùs arcuatis, acutis, armato; terminali coriaceo-membranaceo, vel potius pilis longissimis instructo.

Palpi Maxillares articulo secundo conico, tertio breviori conico, ultimo cylindrico ovato. Labiales breves, articulo ultimo cylindrico ovato, aliis subcrassiore.

Mentum breve, subquadratum, margine antico truncato, ciliato, et lateribus convexis.

Caput semicirculare. Corpus convexum, apterum, subtus planiusculum. Thorax scabriusculus, caput excipiens, marginibus lateralibus dilatatis; scutello haud distincto. Elytra abdomen longe obtegentia. Tibiæ anticæ vix dentatæ.

Obs. A Troge instrumentis cibariis et corpore aptero distinctum, sed ad circulum eundem certe pertinens.

Spec. 1. *Phoberus horridus.*

P. ater, thorace elytrisque spinosis: his striis quinque spinosis margineque ciliatis.

Trox horridus. *Fab. Syst. Eleuth.* vol. i. p. 111.
——————— *Oliv. Ins.* 1. 4. 5. 1. tab. 1. fig. 2.
Scarabæus pectinatus. *Pall. Icon.* 1. p. 10. tab. A. fig. 10.
Habitat ad Caput Bonæ Spei.
Mus. D. MacLeay.

Genus. CRYPTODUS.

Antennæ dum contrahuntur ut in Troge sub thoracis lateribus inflexæ, novem-articulatæ, articulo basilari glabro, dilatato, triquetro-trigono, reliquos usque ad clavam operiente, articulo sexto vix distincto, septimo vel capituli primo dilatato, subconico, duobus aliis dilatatis.

Labrum corneum, semicirculare, margine solum exsertum.

Mandibulæ nec validæ nec crassæ, triquetro-trigonæ, arcuatæ, apice acutissimæ, ad basin sinu interrupto unidentatæ.

Maxillæ glabræ, corneæ, validæ, processu terminali spinis duabus glabris elongatis intus arcuatis acutissimis instructo; laciniâ internâ, loco ciliarum præcedentis generis, spinis tribus minutissimis acutis nunc armatâ.

Palpi Maxillares fere omnino ut in Phobero. Labiales mento absconditi, intus labii ad latera inserti, articulo ultimo duobus aliis conjunctim multo longiore, conico-cylindrico, gracili, subobtuso, stipite conico.

Labium membranaceum, pilosum, mento prorsus absconditum, processubus duobus formatum; primo menti ad perpendiculum in stipite affixo, subquadrato, marginibus emarginatis; secundo sicut ferrum equinum brachiis duobus horizontalibus instructo, membranaceis, ciliatis; omni ita galeam reversam aliquantulum simulante.

Mentum maximum, instrumenta cibaria, labri margine excepto, omnino occultans, subpentagonum, antice convexum, angulis subacutis, lateribusque sinuatis.

Caput planum, ut in Coprophagis subsemicirculare. Corpus ut in Phileuro glabrum, depressum, oblongo-ovatum. Thorax transverso-quadratus. Scutellum distinctum triangulare. Elytra abdomen postice haud occultantia. Tibiæ anticæ extus tridentatæ.

OBS. Genus valde anomalum, forsan osculans, Trogidarum antennis mandibulis et maxillis etsi formâ prorsus novâ et singulari indutis dotatum; huic igitur familiæ Cryptodus associandus quamvis mento labroque omnino differt, Passalisque habitu generali et maxillis appropinquare potius videatur.

SPEC. 1. *Cryptodus paradoxus.*

C. ater punctis impressis scaber, capite bituberculato, elytris inter strias elevatas punctis excavatis cum aliis minutissimis ornatis.

Habitat in Australasia.

Mus. D. MacLeay.

Genus. MÆCHIDIUS.

TROX, *Kirby.*

Antennæ novem-articulatæ, articulo basilari magno, elongato conico, secundo brevi conico, tertio graciliori conico, quarto brevissimo, quinto et sexto pateræformibus; capitulo ovato, lamellis lanceolatis acutis.

Labrum crustaceum, antice concavum, margine fere ut in Melolonthidis emarginato.

Mandibulæ ut in Troge breves, triquetro-trigonæ, extus arcuatæ apice acutæ, intus inermes.

Maxillæ ut in Melolonthidis crustaceæ, sinuatæ, apice multidentatæ.

Palpi Maxillares articulo secundo conico, tertio vix breviori, externo cylindrico apice truncato. Labiales brevissimi.

Mentum magnum, lateribus truncatis, quasi e duplici parte formatum, hac stipitali, aliâ terminali inflexâ antice emarginatâ.

Caput subsemicirculare, haud transverse suturatum, clypeo antice emarginato, oculos haud ambiente, margine reflexo. Os labri et menti concursu omnino clausum. Corpus oblongum, ovatum, glabrum, depressum, elytris postice non opertum. Thorax transversus, subconvexus, antice emarginatus, lateribus convexis, margineque postico truncato vix obtusangulo. Scutellum triangulare. Pedes validi, ut in Troge, subcompressi, tibiis anticis extus tridentatis.

SPEC. 1. *Mæchidius spurius.*

M. oblongus scaber subcinereus, elytris seriatim papillatis.

Trox spurius. *Kirby, Linn. Trans.* v. 12. p. 462.

Habitat in Australasiâ.

Mus. D. MacLeay.

OBS. Hoc insectum inter Trogem et Melolontham intermedium, et forsan proprio generi esse celeberrimus Kirby primus observavit. Non equidem dubito quin Trogidis propius sit existimandum.

Fam. DYNASTIDÆ.

Genus. DASYGNATHUS.

Antennæ decem-articulatæ, articulo basilari longiusculo, septimo minutissimo, pateræformi.

Labrum membranaceum, clypeo penitus occultatum, margine antico transverso, bilobo, crustaceo, pilis longis instructo.

Mandibulæ corneæ, compressæ, breves, cultelliformes, supra planæ, superficie inferiori inæquali, margine externo rotundato piloso, interno membranaceo vel fimbriâ instructo.

Maxillæ breves, caule crustaceo valido, subtrigono, processu apicali penicilliformi, vel e setis longiusculis formato.

Palpi Maxillares crassi, articulis secundo et tertio conicis, extimo ovato aliis crassiore et longiore apice subobtuso.

Mentum subquadratum, valde convexum, setis rigidis munitum, lateribus rotundatis, margine antico depresso, emarginato, angulis acutis.

Caput subquadratum, haud transverse suturatum, clypeo porrecto, lateribus rotundatis, margine reflexo crassiusculo. Corpus subtus pubescens, oblongum, ovatum, haud elytris postice obtectum. Thorax marginatus. Scutellum parvum, apice rotundatum. Pedes validi, tibiis anticis extus tridentatis.

SPEC. 1. *Dasygnathus Dejeanii.*

D. nigro-brunneus, subtus pilis ferrugineis opertus, clypeo antice punctato, thorace glabro, elytris profunde striatis ad latera scabriusculis: striis obsoletis, ano punctato glabro.

Habitat in Australasiâ.

Mus. D. MacLeay.

In honorem Dom. Baronis Dejean Galli, qui inter bella externa discordiasque civiles scientiæ deditus, Europæ entomologiam omnis indagavit, solertissimus cultor ac observator acutus.

Obs. In Petalocerorum maxillis examinandis hujusque generis præsertim, quam facile et gradatim dentes maxillares spinarum spinæque rursus ciliarum se formâ induant, Tyronibus operæ pretium sit observare.

B. *THALEROPHAGA.*

Pedes plerumque graciliores, posticis ab aliis æque dissitis; elytra sæpius ad anum haud pertingentia.

Fam. ANOPLOGNATHIDÆ.

Genus. AMBLYTERUS.

Antennæ decem-articulatæ, articulo basilari setoso, secundo, tertio, quarto et quinto globosis, sexto et septimo brevibus pateræformibus.

Labrum crustaceum, hirsutum, exsertum, antice sub lobum deflexum.

Mandibulæ corneæ, breves, validæ, subtrigono-triquetræ, supra planæ, extus arcuatæ, pilosæ, vix emarginatæ, margine interno sub-bidentato.

Maxillæ crustaceæ, subcylindricæ, apice obtusæ, pilosæ, et dentibus minutissimis instructæ.

Palpi Maxillares graciles, articulis secundo et tertio conicis, externo lanceolato, aliis conjunctim longiore, apice subacuto. Labiales articulo ultimo ovato crasso.

Mentum subquadratum, valde hirsutum, convexum, medio antice producto, depresso, truncato, angulis rotundatis palpigeris.

Caput subquadratum, transverse suturatum, clypeo antice rotundato, margine subreflexo. Corpus ovatum, elytris postice non opertum, scutello magno triangulari. Sternum non productum. Pedes validiusculi, tibiis anticis extus tridentatis.

Spec. 1. *Amblyterus geminatus.*

A. brunneus subtus pilis testaceis obtectus, clypeo thoraceque punctatis æneo-olivaceis, scutello glabro æneo, elytris æneis brunneis punctatis: seriebus quatuor punctorum per paria ordinatis, ano hirsuto, pedibus æneis pilosis.

Habitat in Australasiâ.

Mus. D. MacLeay.

Obs. Hoc in genere ad Rutelidas fere attinente Pelidnotæ mandibulas et mentum cernamus, dum instrumentis cibariis Chasmodiæ propinquare habeatur Dasygnathus. Haud tamen necesse duco Dynastidarum affinitatem cum Amblytero jam ulterius præferre, quum genera inter se habitu generali quam maxime cohærentia efformant.

Genus. ANOPLOGNATHUS, *Leach.*

Antennæ articulis decem, basilari conico, crasso, secundo subgloboso, quatuor proximis subconicis, septimo pateræformi brevissimo, capituloque elongato semi-ovato piloso.

Labrum corneum transversum, antice medio acuminatum.

Mandibulæ breves, subcompressæ, validæ, subtrigonæ, basi crassæ, apice obtusæ, edentulæ, integerrimæ, extus convexæ, intus acutæ, margine concavo.

Maxillæ mandibuliformes, plane inermes, validæ, corneæ, subtrigonæ, fornicatæ, apice obtusæ, subemarginatæ.

Palpi Maxillares subclavati. Labiales breves, articulo secundo brevissimo, externo ovato, vix ultra mentum prominulo.

Mentum subquadratum, ad basin utrinque emarginatum, angulis palpigeris, in medio processu porrecto subreflexo munitum.

Caput subquadratum, transverse suturatum, clypeo in fœminis semper rotundato semicirculari, sed in maribus interdum angulato, margine antico in uno et altero sexu reflexo. Corpus sub-convexum, ovatum, ano nudo saltem in uno sexu. Sternum sæpius ad pedum primi paris originem acute productum. Pedes validissimi, tibiis anticis in maribus saltem vix extus tridentatis, tarsorum unguibus indivisis et inæqualibus.

In duas divisiones commode distribui potest Anoplognathi genus.

* *Menti apice sub-acuto recurvo.*

MAS clypeo producto subrostriformi, lateribus late emarginatis, antice truncato, convexiusculo, margine reflexo.

FEMINA clypeo semicirculari.

SPEC. 1. *Anoplognathus viridi-æneus.*

Anoplognathus viridi-æneus punctulatus, elytris basi punctatis: punctis in strias subdigestis, pedibus castaneis, tarsis nigris.

A. viridi-æneus. *Leach, Zool. Miscellany,* vol. 2. p. 44.

Melolontha viridi-ænea. *Don. Ins. New Holl.*

Habitat in Novâ Hollandiâ. Mus. D. MacLeay.

OBS. *A. viridi-tarsis* Leach, *rugosus* Kirby, *inustus* Kirby, huic generis sectioni associandi.

* * *Menti apice truncato subrecurvo. Genus* REPSIMUS, *Leach, MSS.*

Maris femora et tibiæ valde sunt incrassatæ, at clypeus in utroque sexu semicircularis. In his a sectione priore differentiæ cardo præcipue vertitur.

SPEC. 2. *Anoplognathus Dytiscoides.*

A. niger nitidissimus, clypeo atro subrugoso: punctis duobus postice impressis, thorace atro-ferrugineo, elytris glaberrimis atris, corpore subtus nigro pilis albidis ad abdominis latera præsertim hirsuto, pedibus rufis, tarsis nigris.

Habitat in Australasiâ. Mus. D. MacLeay.

SPEC. 3. *Anoplognathus Brownii.*

A. rufus nitidissimus, capite nigro rugoso postice haud bipunctato, thorace rufo, elytris brunneis glaberrimis, corpore subtus nigro pilis albidis ad abdominis latera præsertim hirsuto, pedibus rufis, tarsis nigris.

Botanicorum hodiernorum principi hanc speciem dicavi præcedenti nimis affinem ab illo in Australasiâ lectam, et meo cum patre amicissime communicatam.

Obs.—Secundam Anoplognathi sectionem novum esse genus sibi persuasum habet vir in scientiâ naturali omni celeberrimus, Entomologiâ præcellens, D. Leach; nec mihi quidem displicuisse hujus sententiam putari vellem, parvi quoniam plane interest utrum diligentiâ observentur divisiones artificiales, an cuique liceat eas contemnere. Si vero ordinem præcedentem ad pulcherrimam sectionum affinitatem inter se exponendam aptiorem fuisse habuerim, Entomologi adeo in errorem duci minus quam in veritatem mihi videntur.

Genus. LEUCOTHYREUS.

Antennæ decem-articulatæ, articulo primo conico, piloso, secundo sub-globoso, articulis tertio et quarto longiusculis, cylindricis, gracillimis, septimo brevissimo pateræformi; capitulo semi-ovato piloso.

Labrum magnum antice lobatum, lobo vix obtuso.

Mandibulæ breves, subtriquetro-trigonæ, supra planæ, apice crassiores, integræ, obtusæ, extus arcuatæ, pilosæ, intus subacutæ.

Maxillæ mandibuliformes, validæ, breves, vix arcuatæ, sed medio quasi fractæ, apice obtusæ, subbidentatæ.

Palpi Maxillares subclavati; Labiales brevissimi articulo ultimo vix ultra mentum obvio.

Mentum transversum, subquadratum, basi palpigerum, medio antice producto; processus hujus apice crasso, vix recurvo, profunde emarginato.

Caput subquadratum, transverse suturatum, clypeo semicirculari, margine reflexo. Corpus oblongo-ovatum convexiusculum; thoracis lateribus sinuatis; sterno haud producto. Pedum femora haud incrassata; tibiis anticis extus vix tridentatis. Tarsorum ex unguibus unus indivisus alter bifidus.

SPEC. 1. *Leucothyreus Kirbyanus.*

L. capite thoraceque æneis punctatis; hoc utrinque squamis albidis asperso, elytris viridi-brunneis haud nitidis obsolete punctatis; lineis quatuor subelevatis, scutello albido squamis obtecto, corpore subtus cupreo; lateribus albido-squamosis, ano scabriusculo lituris duabus albo-squamosis, pedibus æneis.

Habitat in Braziliâ. Mus. D. MacLeay.

Ob consilia mihi amicissime oblata, dixi in honorem Dom. Kirby, qui opere nunquam nimis laudando *Monographiá Apum Angliæ* nomen Anglicanum in summa scientiæ naturalis fastigia attulit.

OBS. Ex Leucothyreis in Geniatem ac alia Anoplognathidarum genera maxillis multidentatis facili gradu ducimur.

Fam. MELOLONTHIDÆ.

Genus. SERICA.

SCARABÆUS, *Linn.* MELOLONTHA, *Fab. Oliv. Lat.*

Antennæ articulis decem, basilari crasso clavato piloso, secundo globoso, tertio et quarto subcylindricis brevibus, quinto conico, sexto et septimo pateræformibus, hoc vix distincto; capitulo trilamellato, maris valde elongato angusto.

Labrum emarginatum, pilosum.

Mandibulæ brevissimæ, crassæ, trigono-triquetræ.

Maxillæ mandibulis duplo longiores, trigono-triquetræ, intus ad apicem sexdentatæ, caule subquadrato, margine interno recto.

Palpi Maxillares, articulis omnibus præter extimum pilosis, hoc aliis conjunctim breviore, cylindrico, apice subacuto. Labiales articulis primo secundoque hirsutis, ultimo acutissimo, vix incurvo.

Mentum oblongo-quadratum, stipite convexo vel antice retuso; parte apicali carinâ vel lineâ elevatâ transversâ; margine antico emarginato.

Corpus breviter ovatum, convexum, elytris elongatis. Thorax brevissimus, transversus; scutello oblongo-triangulari. Pedes tenues, tarsis longissimis, unguibus æqualibus ad apicem bifidis; dente supero graciliore, longiore, acuto.

SPEC. 1. *Serica brunnea.*

S. rufo-testacea glabra, clypeo punctato: vertice plerumque nigricante, thorace vix punctulato: puncto utrinque obsoleto fusco, elytris obsolete punctato-striatis.

Melolontha brunnea. *Fab. Syst. Eleuth.* ii. 170. 54.
Scarabæus brunneus. *Marsh. Ent. Brit.*
Scarabæus brunneus. *Linn. Syst. Nat.* ii. 556. 72.
Habitat in Europæ sabulosis.

Genus. EUCHLORA.

MELOLONTHA, *Fab. Oliv.*

Antennæ articulis novem, basilari conico elongato, secundo, tertio, quarto, quinto et sexto brevibus subglobosis; capitulo ovato, triphyllo, elongato, antennarum longitudinis totius haud dimidium æquante.

Labrum prominulum, clypeo fere absconditum, margine antico lineari, ciliato, emarginato, lateribus rotundatis.

Mandibulæ latitantes subtrigonæ supra planæ, latere externo rotundato, interno ciliato ad apicem tridentato.

Maxillæ caule subtrigono-triquetro, ad apicem inflexæ sexdentatæ.

Palpi Maxillares articulo terminali cylindrico ovato. Labiales articulis secundo et ultimo longitudine æqualibus, hoc subulato.

Mentum subquadratum, margine antico emarginato, angulis truncatis rotundatis ac lateribus sinuatis, postice valde convexis.

Caput subquadratum, clypeo lateribus rotundatis, margine reflexo. Corpus ovatum convexum, postice elytris haud opertum. Thorax subquadratus, ad basin duplo longior quam latior, latere postico sinuato vix lobato. Scutellum parvum cordato-truncatum. Sternum haud productum. Pedes validiusculi tibiis anticis bidentatis. Tarsorum ungues posticorum indivisi, reliquorum ex unguibus unus bifidus alter indivisus.

Spec. 1. *Euchlora viridis.*

E. glabra punctata supra viridis subtus cupreo-aurata, pedibus cupreis.

Melolontha viridis. *Fab. Ent. Syst.* ii. 160. 23.

Melolontha viridis. *Oliv. Inst.* i. 5. 29. 31. tab. 3. fig. 21. b.

β. Var. Elytris cuprec-marginatis.

Habitat in Chinâ. Mus. D. MacLeay.

Spec. 2. *Euchlora Jurinii.*

E. nitidissima punctata supra viridi-olivacea subtus viridicuprea, thorace utrinque punctis duobus impressis, pedibus viridibus.

Habitat in Javâ.

Mus. D. MacLeay.

Dixi in honorem illius Entomologiæ magistri præcellentis D. Jurine apud Genevenses anatomiæ artisque chirurgicæ doctissimi professoris.

Obs. 1. En genus Asiaticum Areodæ proximum, speciebus e pluribus constans, quod a Melolonthidis quidem mandibulis extus integris sub clypeo latitantibus, maxillis sinuatis, et sterno haud producto, a Rutelidis contra labro tenui prominulo, et mento subquadrato vix retuso haud longe distat. Hîc igitur inter Petalocera Thalerophaga subdivisio duplex eadem quam circulos duos inter Saprophaga jam formantem observavimus, facile discernatur.

Obs. 2. Inter Euchloræ genus et *Rutelam ignitam* Oliv. *Cyanipedem* K. &c. veniunt *Cetonia Macropus* K. (Anglice, *Kangaroo Beetle*) et *Melolontha chrysochlora* Humboldt. Obs. de Zool. et d'Anat. Comp.

Genus. CHALEPUS.

SCARABÆUS, *Voet.* MELOLONTHA, *Fab. Oliv.* GEOTRUPES, *Schönherr.*

Antennæ quasi fractæ, articulis decem, basilari subconico vel potius antice lobato, secundo subgloboso minuto, sexto septimoque majoribus pateræformibus; capitulo triphyllo, subcompresso elongato ovato.

Labrum sub clypeo latitans, margine antico lunari vix obvio, infra subemarginato.

Mandibulæ ad basin crassæ, triquetro-trigonæ, extus arcuatæ, apice acutæ, intus inermes.

Maxillæ crustaceæ, validæ, elongatæ, subcompressæ, vix sinuatæ, apice sexdentatæ, dentibus brevibus validis corneis.

Palpi Maxillares articulo primo vix distincto, secundo subconico, tertio breviori conico, ultimo elongato cylindrico ovato, ad apicem basinque graciliore. Labiales breves ad menti loborum dorsa inserti, articulo primo gracili conico, secundo breviore crassiore conico, extimo cylindrico ovato.

Mentum subquadratum, versus apicem utrinque paulo angustatum, margine supero profunde emarginato, lobis subrotundatis—Supra convexum, margine postico emarginato vel potius excavato.

Caput subquadratum vel trapezoide, transverse suturatum, clypeo antice truncato vix emarginato. Corpus subconvexum, thorace transverso lateribus convexis, margineque postico truncato. Sternum non productum. Elytra abdomen haud obtegentia. Tibiæ anticæ extus tridentatæ.

SPEC. 1. *Chalepus geminatus.*

C. nigro-piceus nitidus, capite thoraceque punctatis, elytris punctato-striatis: striis geminatis interstitiisque punctatis.

Scarabæus fimosus Surinamensis. *Voet. Ins.* 21. 140.

Melolontha geminata. *Fab. Syst. Eleuth.*

Melolontha dubia. *Oliv. Ent.* vol. i. no. 5. p. 32. tab. 3. fig. 20. *a. b.*

Geotrupes lugubris. *Schönherr. Synon. Ins.* vol. 1. p. 21. t. 2. f. 1. a.

Habitat in Americâ meridionali. Mus. D. MacLeay.

Obs. 1. A synonymiâ laudatâ nomen derivatur genericum. *M. geminatam* Fab. Syst. Eleuth. suæ *Apogoniæ gemellatæ* congenericam esse suspicatur Cl. Kirby, Linn. Trans. v. xii. p. 404. Familiis autem diversis hæc insecta, nisi fallor, distribuenda sunt; descriptione enim apud Fabricium et Schönherri Synonymiâ Insectorum collatis, *M. geminatam* pro novi generis typo Americani, Euchloram vel genera Rutelidarum extima Dynastidis annectentis esse habendam mihi persuasissimum est; Apogonia vero Anoplognathidis apud Kirbium recte associata pro genere omnino Asiatico, hujus familiæ extremo, habeatur.

Obs. 2. Si faciem suam Heteromerorum personâ occultasse animo Chalepus fingatur, Hexodontis genus statim videbimus. Quod enimvero patri meo summâ benevolentiâ dedêre Musæi Gallici administratores doctissimi, auspice cel. Latreillio, illi exemplari antennæ desunt. Anatomiâ vero hujus insecti tam rari quam singularis reliquâ nuperrime perpensâ, Labro brevi corneo subemarginato; Mandibulis corneis crassis triquetro-trigonis arcuatis apice subacutis; Maxillis crustaceis, validis, elongatis, vix sinuatis apice sexdentatis; Palpis maxillaribus articulo primo minimo, secundo conico, tertio breviori conico, ultimo elongato, labialibus brevibus, articulo primo et secundo conicis extimo cylindrico ovato; Mento subquadrato margine supero emarginato; Capite subquadrato, clypeo antice truncato vix emarginato—Hæc omnia et adhuc alia Chalepi proximitatem satis mihi monstraverunt. Quoad corporis formam a Petaloceris Hexodon longe distat, illam Heteromerorum potius referens ut genus inter Asidam et Erodium ponendum primo intuitu prorsus esse videatur. Characteres enim procul dubio Pimelidis cum illo communes sunt, nempe, Caput thorace multo angustius, illius margine antico profunde emarginato intrusum, Oculi parvi, Elytra subtus inflexa dilatata corporis latera involventia, Scutellum breve, Pectus brevissimum fere nullum, cum corpore denique ipso suborbiculari supra convexo subtus plano. Quum vero hæc ipsa Trogidis quodammodo adsunt, inter Troges et Chalepum Hexodontis situm quasi temporarium, examine ulteriori si minus emendatione carentem eruditis offerre haud incautus vellem.

Fam. GLAPHYRIDÆ.

Interea dum hæc familia inter Melolontham et Cetoniam a Latreillio recte disponitur, genera quædam extrema vel horum potius typos *Amphicomam abdominalem* (Lat. Gen. Ins.) et *Trichium trilineatum* (Fab.) indicasse sufficiat.—Fateri autem oporteat hanc dicendi rationem nullas leges agnoscere posse, ideoque generum Petalocerorum Synopsi diutius esse attendendum.

Obs. Hic locanda sunt genera *Monochelus* Knoch et *Anthipna* Eschscholtz *Act. Acad. Imp. Scient. Petrop.* vol. vi. p. 472. quorum ultimum, monente Leachio, duas divisiones genericas Latreillianas Amphicomam et Anysonychem continere videtur.

Fam. CETONIIDÆ.

Genus. PLATYGENIA.

Antennæ decem-articulatæ, articulo basilari magno crasso, conico, parum elongato, secundo subgloboso; sexto lato pateræformi; septimo brevissimo, vix distincto; capitulo subcompresso, elongato ovato.

Labrum clypeo penitus tectum, lato-transversum, subcordatum, submembranaceum, antice emarginatum, hirsutissimum.

Mandibulæ breves, basi crassæ, corneæ, latere externo producto, corneo, lanceolato, apice rotundato vel obtuso, membranâ subquadratâ, translucidâ, fimbriatâ intus auctæ.

Maxillæ laciniâ internâ subtrigonâ, dilatatâ, apice emarginatâ, setosâ; terminali fasciculis penicilliformibus elongatis instructâ.

Palpi Maxillares articulo secundo subgloboso, tertio subconico, extimo subovato cylindrico, apice obtuso. Labiales in ore sæpe latitantes, versus menti angulos inserti.

Mentum latissimum, subquadratum, in medio concavum, lateribus subemarginatis, margineque antico emarginato, subreflexo.

Caput quadratum; clypeo integro margine subreflexo. Corpus depressum, subtus vix pilosum, postice elytris haud opertum. Thorax latus depressus, lateribus convexis, margine postico truncato. Scutellum mediocre subtrigonum. Sternum non productum, pectore magno, medio hirsuto. Pedes validi; Tibiis anticis extus bidentatis, posticis intus hirsutissimis.

Obs. Genus inter Cetoniidas formæ singularis et habitus fere Saprophagi, nullo tamen modo Rectoceris accedens. At verbis quid opus est? Si Lucanis Cetoniidæ annectantur, actum est ilicet de omni ordine naturali.

Spec. *Platygenia Zairica.*

P. atra nitida, capite punctato, thorace glabro, elytris striatis, ano et corpore subtus atro-ferrugineis haud nitidis.

Mus. D. MacLeay.

Insectum in ripas Zairæ fluminis Africani insalubres a Domino Cranch, pro scientiis naturalibus et entomologiâ imprimis heu! quantum deflendo, nuper lectum.

Genus. GYMNETIS.

Cetonia, *Fab. Oliv. Latr.*

Antennæ articulis decem, basilari subgloboso magno, clavâ triphyllâ ovatâ.

Labrum margine antico ciliato, emarginato, lateribus rotundatis.

Mandibulæ breves, processûs latere externi fere sinuato, apice obtuso vel rotundato.

Maxillæ laciniâ internâ membranaceâ, ciliatâ, processu terminali articulato, compresso, fimbriâ hirsutâ instructo.

Palpi Maxillares vix ultra maxillarum apicem productæ, articulis primo et secundo brevibus, penultimo conico, ultimo subcylindrico apice truncato. Labiales menti lateribus excavatis inserti, articulis duobus baseos conicis, externo longissimo ovato.

Mentum cordato-truncatum, ad basin et ad latera depressum, utrinque paulo angustatum, et lineis duabus elevatis angulum ad apicem formantibus instructum; margine antico profunde emarginato, lateribus rotundatis.

Caput subquadratum; clypeo supra irregulari. Corpus ovatum depressum, ad humeros latius, elytrorum margine externo ad basin abrupte sinuato. Thorax subtrigonus, antice angustior et truncatus, postice lobatus, lobo magno triangulari apice subobtuso. Scutellum minimum. Sternum tuberculiforme, vix ad pedum secundi paris originem obtuse productum. Pedes graciles tibiis anticis bidentatis, fere tridentatis, unguibus æqualibus indivisis. Scapulæ secundi et tertii pedum paris distinctæ.

SPEC. *Gymnetis nitida.*

G. viridi testacea, capite spinâ incumbente.

Scarabæus nitidus. *Linn. Syst. Nat.* ii. 552. 52.

Cetonia nitida. *Fab. Syst. Eleuth.* ii. 139. 24.

———— *Oliv. Ent.* i. 6. 18. 14. tab. 3. f. 16.

Habitat in Americâ boreali.

Mus. D. MacLeay.

OBS. In speciebus quibusdam, genus proprium forsan efformantibus, scutellum prorsus evanescit.

Fam. RUTELIDÆ.

Formæ typi omnis inter Rutelidas mihi posthac præponendi tempus sit; pauca tamen quæ ad hanc familiam cognoscendam lectori utilia sint nunc præmonere licet.

Tres sunt Rutelæ typi apud Cl. Latreillium, qui tot genera adeo indicasse dicatur.

1. *Melolontha punctata*, Fab.

Cetonia ignita (Oliv.) et *R. cyanipes* K. hoc cum insecto affinitatem haud levem habent, tametsi instrumentis cibariis, maxillis præsertim, illas differri suspicor.

2. *Cetonia Lineola*, Fab.

Genus quidem distinctum quod Rutelæ nomen retineat. Huic *Rutela pulchella* K. proprii generis insectum proximè accedit, at sic genericè dignoscatur.

Rutela Lineola. Mandibulæ intus tridentatæ.

Maxillæ breviores arcuatæ, ad apicem sexdentatæ at laciniis duabus majoribus vix instructæ.

Palpi maxillares articulo secundo et tertio fere eâdem longitudine, extimo elongato, ovato, apice truncato.

Mentum subquadratum, margine antico emarginato, angulis truncatis lateribusque vix sinuatis.

Rutela pulchella. Mandibulæ intus inermes.

Maxillæ elongatæ, rectiusculæ, ad apicem laciniis duabus tridentatis instructæ.

Palpi maxillares, articulo secundo longiore, extimo maximo, ovato lanceolato, apice subacuto.

Mentum oblongo-quadratum, margine antico emarginato, angulis anticis subacutis rotundatis, lateribus valde sinuatis.

A *Rutelâ pulchellâ*, nisi instrumentis cibariis nondum examinatis, *R. Liturella* K. vix longe recedat.

3. *Cetonia Chrysis*, Fab.

Huic formæ typo accedunt *Cetonia fucata* Fab., *smaragdula* Fab., *clavata* Fab., *lucida* Fab., *splendida* Fab., *lateralis* Oliv. &c. Alium adhuc typum quem Cel. Latreillius haud quidem cognoverat Chasmodiæ genus constituere putavi.

OBS. Hexodon genus est fere Saprophagum quod perperam Rutelidis associatum fuisse censeo.

Genus. CHASMODIA.

Antennæ articulis decem, basilari magno, subarcuato, conico; secundo subgloboso; tertio longiore, subcylindrico; quarto, quinto, et sexto brevibus; septimo brevissimo pateræformi; capitulo ovato elongato.

Labrum porrectum, ciliatum, bifidum, laciniis rotundatis.

Mandibulæ validæ, corneæ, elongatæ, subtus canaliculatæ, latere externo profunde emarginato, extra clypeum eminulo, interno membranaceo ciliato, apice interno integro.

Maxillæ corneæ, bidentatæ, supra membranaceæ, ciliis productis penicilliformibus.

Palpi Maxillares, articulo tertio subgloboso, quarto ovato apice obtuso. Labiales graciles, ad angulos menti inserti, articulo extimo subacuto.

Mentum elongatum, concavum, lateribus sinuatis, vel ad palporum insertionem profunde excavatis, apice truncato maximo ciliato.

Caput subquadratum, clypeo profunde emarginato, margine reflexo. Corpus ellipsoide depressum; Thorax duplo longior quam latior; Scutello magno trigono. Sternum usque ad pedum primi paris originem productum haud acutum. Pedes validiusculi, tibiis anticis tridentatis, posticis subcompressis. Tarsi mediocres unguibus indivisis.

SPEC. 1. *Chasmodia viridis.*

C. atro-viridis nitidissima glaberrima, thorace marginato, elytris obsoletissime striatis, ano et corpore subtus ad latera rugosis, femoribus et thorace subtus pilosis, tarsis nigris.

Habitat in Braziliâ.

Mus. D. MacLeay.

SPEC. 2. *Chasmodia bipunctata.*

C. nigro-castanea glaberrima subtus nigrescens, capite thoraceque brunneis; hujus margine flavescente, scutelli margine nigro, elytris castaneis obsoletissime striatis, ani nigrescentis punctis duobus abdominis segmentis ad latera et sterni apice flavescentibus, pedibus castaneis.

Habitat in Braziliâ.

Mus. D. MacLeay.

Genus. MACRASPIS.

SCARABÆUS, *Drury.* CETONIA, *Fab. Oliv.*

Antennæ clavâ magnâ oblongâ, longitudinis totius illarum haud dimidium æquante. Articulo basilari conico parum elongato.

Labrum transversum, margine antico subsemicirculari, exserto, coriaceo, integro, hirsuto, apice subacuto.

Mandibulæ subtrigonæ, compressæ, supra concavæ, latere externo eminulo, emarginato, vix bidentato, apice interno subemarginato.

Maxillæ intus margine membranaceo instructæ et ad apicem processubus duobus tridentatis corneis productæ.

Palpi Maxillares articulo extimo magno subgloboso ovato. Labiales articulo ultimo elongato ovato.

Mentum elongatum subquadratum concavum, lateribus sinuatis, apice truncato haud ciliato vix emarginato.

Caput subquadratum, clypeo rotundato margine reflexo. Corpus ellipsoide depressum; thorace duplo longiori quam latiori, latere postico emarginato. Scutellum maximum elongato-trigonum. Sternum ad capitis originem productum acutum. Pedes validiusculi, tibiis anticis tridentatis, posticis subcompressis; tarsorum ex unguibus unus indivisus alter bifidus.

Spec. 1. *Macraspis quadri-vittata.*

M. atra nitida, thoracis margine omni elytrorumque vittis duabus flavis.

Scarabæus Cineta. (cinctus?) *Drury Ins.* 3. tab. 44. fig. 4.

Cetonia quadri-vittata. *Oliv. Ins.* 1. 6. 92. 7. tab. 8. fig. 65.

Cetonia fucata. *Ent. Syst.* 2. 145. 69.

Habitat in Americâ meridionali.

Mus. D. MacLeay.

Spec. 2. *Macraspis bi-vittata.*

M. supra testacea nitida subtus nigra, capite fulvo lineâ transversâ nigrâ, thoracis duabus maculis scutelli fulvi margine elytrorum vittâ ac suturâ nigris, pedibus testaceis.

Habitat in Americâ meridionali.

Mus. D. MacLeay.

Obs. Speciem priorem ad animum revocans.

Genus. PELIDNOTA.

Scarabæus, *Linn.* Melolontha, *Fab. Oliv.* Rutela, *Lat.*

Antennæ articulis decem, basilari magno subarcuato conico; secundo subgloboso, tertio longiore subcylindrico, quarto, quinto et sexto brevibus, septimo brevissimo, pateræformi; capitulo ovato.

Labrum exsertum transversum, subsemicirculare, pilosum vel ciliatum, margine antico emarginato.

Mandibulæ subcompressæ, triquetro-trigonæ, supra planiusculæ, latere externo arcuato emarginato, intus ad apicem bidentatæ.

Maxillæ corneæ, crassæ, pilosæ, incurvæ, intus ad apicem sexdentatæ, dentibus acutissimis.

Palpi Maxillares articulo basilari brevi subcylindrico, secundo longiore, tertio breviore ad apicem crassiore, externo ovato subcanaliculato. Labiales breves articulo ultimo ovato.

Mentum breve quadratum, postice convexum vel retusum, lateribus sinuatis, margine antico emarginato angulis rotundatis.

Caput subtrigonum, haud transverse suturatum; clypeo rotundato obtuso margine reflexo. Corpus ovatum convexum postice elytris haud opertum. Sternum brevissimum subretusum. Scutellum mediocre semicirculare. Pedes validiusculi, tibiis anticis extus tridentatis, tarsorum unguibus inæqualibus.

SPEC. *Pelidnota punctata.*

P. testacea, elytris maculis tribus fuscis distantibus.

Scarabæus punctatus.	*Linn. Syst. Nat.* 2. 557. 78.
Melolontha punctata.	*Fab. Syst. Eleuth.* 2. 166. 28.
————————	*Oliv. Ins.* 1. 5. 22. 18. tab. 1. f. 6.

β. Variat maculis indistinctis.

Habitat in Americâ boreali.

Mus. D. MacLeay.

Genus. AREODA. *Leach,* MSS.

Antennæ decem-articulatæ, articulo basilari oblongo, conico, piloso; secundo brevi subgloboso; tertio, quarto, quinto, sexto et septimo brevibus; ultimis tribus clavam elongatam sublanceolatam formantibus.

Labrum corneum, margine antico obvio crasso, infra profunde emarginato.

Mandibulæ corneæ, validæ, subtrigonæ, supra planæ, latere externo integro rotundato, interno ciliato et ad apicem emarginato vix tri-dentato.

Maxillæ validæ, corneæ, inflexæ, apice sex-dentatæ.

Palpi Maxillares articulo basilari brevi, secundo elongato conico, tertio brevi conico, ultimo elongato ovato vel cylindrico apice subacuto. Labiales menti lateribus inserti, articulo ultimo subcrassiori ovato.

Mentum subquadratum, versus apicem utrinque paulo angustatum, ad apicem inflexum, truncatum, vix emarginatum, angulis vix rotundatis.

Caput subquadratum, clypei lateribus rotundatis margine reflexo. Corpus ovatum, convexum; coleoptris abdomen haud obtegentibus. Thorax subtrapeziformis, ad basin fere duplo longior quam latior, latere postico sinuato vix lobato. Scutellum mediocre cordato-truncatum. Sternum usque ad secundi pedum paris originem porrectum. Pedes validiusculi, tibiis bidentatis; tarsorum unguibus indivisis.

SPEC. *Areoda Leachii.*

A. viridis nitidissima supra lurida splendore viridi-aureo, capite thoraceque punctatis, elytris punctatis striatis: striis geminatis, scutello glabro, ano viridi subtilissime densissimeque punctato, pedibus viridiaureis.

Habitat in Braziliâ.

Mus. D. MacLeay.

OBS. 1. Genus Euchloræ proximum inter Anoplognathidas et Rutelidas ponendum; Areoda enim Anoplognathi feminæ omnino habitu similis est, sed ore toto differt.

OBS. 2. Hoc a genere distat OPLOGNATHUS (Kirby MSS.) mandibulis extus subemarginatis apice tridentatis, maxillis vix sexdentatis, palpis labialibus menti dorso insertis, mento apice emarginato angulis rotundatis, clypeo quadrato, truncato, angulato, &c. Ut facie externâ Anoplognathi feminam Areoda, sic primæ sectionis marem simulat Oplognathus; ex quo efficitur trium generum affinitatem videri posse apertissimam.

Spec. *Oplognathus Kirbii.*

O. viridis nitidissimus supra luridus splendore viridi-aureo, capite punctis scabro, thorace glaberrimo punctato bimaculato: maculis nigris, elytris striato-punctatis, ano viridi subtilissime densissimeque punctato, pedibus viridi-castaneis.

Habitat in Braziliâ.

Mus. D. MacLeay.

END OF PART I.

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